

Atomic bombings of Hiroshima and Nagasaki

During the final stage of World War II, the United States detonated two nuclear weapons over the Japanese cities of Hiroshima and Nagasaki on August 6 and 9, 1945, respectively. The United States had dropped the bombs with the consent of the United Kingdom as outlined in the Quebec Agreement. The two bombings killed at least 129,000 people, most of whom were civilians. They remain the only use of nuclear weapons in the history of warfare.

In the final year of the war, the Allies prepared for what was anticipated to be a very costly invasion of the Japanese mainland. This undertaking was preceded by a conventional and firebombing campaign that destroyed 67 Japanese cities. The war in Europe had concluded when Germany signed its instrument of surrender on May 8, 1945. As the Allies turned their full attention to the war in the Pacific War, the Japanese faced the same fate; the Allies called for the unconditional surrender of the Imperial Japanese armed forces in the Potsdam Declaration on July 26, 1945—the alternative being "prompt and utter destruction". The Japanese ignored the ultimatum and the war continued.

By August 1945, the Allies' Manhattan Project had produced two types of atomic bomb, and the 509th Composite Group of the United States Army Air Forces (USAAF) was equipped with the specialized Silverplate version of the Boeing B-29 Superfortress that could deliver them from Tinian in the Mariana Islands. Orders for atomic bombs to be used on four Japanese cities were issued on July 25. On August 6, one of its B-29s dropped a Little Boy uranium gun-type bomb on Hiroshima, and U.S. President Harry S. Truman again called for Japan's surrender, warning it to "expect a rain of ruin from the air, the like of which has never been seen on this earth." Three days later, on August 9, a Fat Man plutonium implosion-type bomb was dropped by another B-29 on Nagasaki. The bombs immediately devastated their targets. Over the next two to four months, the acute effects of the atomic bombings killed 90,000–146,000 people in Hiroshima and 39,000–80,000 people in Nagasaki; roughly half of the deaths in each city occurred on the first day. Large numbers of people continued to die from the effects of burns, radiation sickness, and other injuries, compounded by illness and

Atomic bombings of Hiroshima and Nagasaki	
Part of the Pacific War of World War II	
<div><div></div><div></div></div> <div>Atomic bomb mushroom clouds over Hiroshima (<i>left</i>) and Nagasaki (<i>right</i>)</div>	
Date	August 6 and August 9, 1945
Location	Hiroshima and Nagasaki, Empire of Japan
Result	Allied victory
Belligerents	
<div><div> United States</div><div><i>Manhattan Project:</i></div><div><div> United Kingdom</div><div> Canada</div></div></div>	<div><div> Japan</div></div>
Commanders and leaders	
<div><div><div> William S. Parsons</div><div> Paul W. Tibbets, Jr.</div><div> Charles Sweeney</div><div> Frederick Ashworth</div></div><div> Shunroku Hata</div></div>	
Units involved	
<div>Manhattan District: 50 U.S., 2 British 509th Composite Group: 1,770 U.S.</div>	<div>Second General Army: Hiroshima: 40,000 (5 Anti-aircraft batteries) Nagasaki: 9,000 (4 Anti- aircraft batteries)</div>

malnutrition, for many months afterward. In both cities, most of the dead were civilians, although Hiroshima had a sizable military garrison.

Japan announced its surrender to the Allies on August 15, six days after the bombing of Nagasaki and the Soviet Union's declaration of war. On September 2, the Japanese government signed the instrument of surrender, effectively ending World War II. The atomic bombings immediate and long-term consequences for military strategy (including the new realm of nuclear warfare), human health, and international relations, as well as their impact on the social and political character of subsequent world history and popular culture, have been extensively studied. The ethical and legal justification for the bombings is still debated to this day.

Casualties and losses	
20 British, Dutch, and American prisoners of war killed	Hiroshima:
	▪ 20,000 soldiers killed
	▪ 70,000–126,000 civilians killed
	Nagasaki:
	▪ 39,000–80,000 killed
	Total: 129,000–226,000+ killed

Contents

Background

- Pacific War
- Preparations to invade Japan
- Air raids on Japan
- Atomic bomb development

Preparations

- Organization and training
- Choice of targets
- Proposed demonstration
- Leaflets
- Consultation with Britain and Canada
- Potsdam Declaration
- Bombs

Hiroshima

- Hiroshima during World War II
- Bombing of Hiroshima
- Events on the ground
- Japanese realization of the bombing

Events of August 7–9

Nagasaki

- Nagasaki during World War II
- Bombing of Nagasaki
- Events on the ground

Plans for more atomic attacks on Japan

Surrender of Japan and subsequent occupation

Depiction, public response, and censorship

Post-attack casualties

Hibakusha

- Double survivors

Korean survivors

Debate over bombings

Notes

References

Further reading

External links

Background

Pacific War

In 1945, the Pacific War between the Empire of Japan and the Allies entered its fourth year. The Japanese fought fiercely, ensuring that the Allied victory would come at an enormous cost. The 1.25 million battle casualties incurred in total by the United States in World War II included both military personnel killed in action and wounded in action. Nearly one million of the casualties occurred during the last year of the war, from June 1944 to June 1945. In December 1944, American battle casualties hit an all-time monthly high of 88,000 as a result of the German Ardennes Offensive.^[1] In the Pacific, the Allies returned to the Philippines,^[2] recaptured Burma,^[3] and invaded Borneo.^[4] Offensives were undertaken to reduce the Japanese forces remaining in Bougainville, New Guinea and the Philippines.^[5] In April 1945, American forces landed on Okinawa, where heavy fighting continued until June. Along the way, the ratio of Japanese to American casualties dropped from 5:1 in the Philippines to 2:1 on Okinawa.^[1]

Although some Japanese soldiers were taken prisoner, most fought until they were killed or committed suicide. Nearly 99% of the 21,000 defenders of Iwo Jima were killed. Of the 117,000 Okinawan and Japanese troops defending Okinawa in April–June 1945, 94% were killed. American military leaders used these figures to estimate high casualties among American soldiers if the planned invasion of the Japanese mainland was undertaken.^[6]

As the Allies advanced towards Japan, conditions became steadily worse for the Japanese people. Japan's merchant fleet declined from 5,250,000 gross tons in 1941 to 1,560,000 tons in March 1945, and 557,000 tons in August 1945. Lack of raw materials forced the Japanese war economy into a steep decline after the middle of 1944. The civilian economy, which had slowly deteriorated throughout the war, reached disastrous levels by the middle of 1945. The loss of shipping also affected the fishing fleet, and the 1945 catch was only 22% of that in 1941. The 1945 rice harvest was the worst since 1909, and hunger and malnutrition became widespread. U.S. industrial production was overwhelmingly superior to Japan's. By 1943, the U.S. produced almost 100,000 aircraft a year, compared to Japan's production of 70,000 for the entire war. By the middle of 1944, the U.S. had almost a hundred aircraft carriers in the Pacific, far more than Japan's twenty-five for the entire war. In February 1945, Prince Fumimaro Konoe advised Emperor Hirohito that defeat was inevitable, and urged him to abdicate.^[7]



Situation of the Pacific War by August 1, 1945. Japan still had control of all of Manchuria, Korea, Taiwan and Indochina, a large part of China, including most of the main Chinese cities, and much of the Dutch East Indies.

Preparations to invade Japan

Even before the surrender of Nazi Germany on May 8, 1945, plans were underway for the largest operation of the Pacific War, Operation Downfall, the Allied invasion of Japan.^[8] The operation had two parts: Operation Olympic and Operation Coronet. Set to begin in October 1945, Olympic involved a series of landings by the U.S. Sixth Army intended to capture the southern third of the southernmost main Japanese island, Kyūshū.^[9] Operation Olympic was to be followed in March 1946 by Operation Coronet, the capture of the Kantō Plain, near Tokyo on the main Japanese island of Honshū by the U.S. First, Eighth and Tenth Armies, as well as a Commonwealth Corps made up of Australian, British and Canadian divisions. The target date was chosen to allow for Olympic to complete its objectives, for troops to be redeployed from Europe, and the Japanese winter to pass.^[10]



U.S. Army poster prepares the public for the invasion of Japan after ending war on Germany and Italy

Japan's geography made this invasion plan obvious to the Japanese; they were able to predict the Allied invasion plans accurately and thus adjust their defensive plan, Operation Ketsugō, accordingly. The Japanese planned an all-out defense of Kyūshū, with little left in reserve for any subsequent defense operations.^[11] Four veteran divisions were withdrawn from the Kwantung Army in Manchuria in March 1945 to strengthen the forces in Japan,^[12] and 45 new divisions were activated between February and May 1945. Most were immobile formations for coastal defense, but 16 were high quality mobile divisions.^[13] In all, there were 2.3 million Japanese Army troops prepared to defend the home islands, backed by a civilian militia of 28 million men and women. Casualty predictions varied widely, but were extremely high. The Vice Chief of the Imperial Japanese Navy General Staff, Vice Admiral Takijirō Ōnishi, predicted up to 20 million Japanese deaths.^[14]

A study from June 15, 1945, by the Joint War Plans Committee,^[15] who provided planning information to the Joint Chiefs of Staff, estimated that Olympic would result in between 130,000 and 220,000 U.S. casualties, of which U.S. dead would be in the range from 25,000 to 46,000. Delivered on June 15, 1945, after insight gained from the Battle of Okinawa, the study noted Japan's inadequate defenses due to the very effective

sea blockade and the American firebombing campaign. The Chief of Staff of the United States Army, General of the Army George Marshall, and the Army Commander in Chief in the Pacific, General of the Army Douglas MacArthur, signed documents agreeing with the Joint War Plans Committee estimate.^[16]

The Americans were alarmed by the Japanese buildup, which was accurately tracked through Ultra intelligence.^[17] Secretary of War Henry L. Stimson was sufficiently concerned about high American estimates of probable casualties to commission his own study by Quincy Wright and William Shockley. Wright and Shockley spoke with Colonels James McCormack and Dean Rusk, and examined casualty forecasts by Michael E. DeBakey and Gilbert Beebe. Wright and Shockley estimated the invading Allies would suffer between 1.7 and 4 million casualties in such a scenario, of whom between 400,000 and 800,000 would be dead, while Japanese fatalities would have been around 5 to 10 million.^{[18][19]}

Marshall began contemplating the use of a weapon that was "readily available and which assuredly can decrease the cost in American lives":^[20] poison gas. Quantities of phosgene, mustard gas, tear gas and cyanogen chloride were moved to Luzon from stockpiles in Australia and New Guinea in preparation for Operation Olympic, and MacArthur ensured that Chemical Warfare Service units were trained in their use.^[20] Consideration was also given to using biological weapons against Japan.^[21]

Air raids on Japan

While the United States had developed plans for an air campaign against Japan prior to the Pacific War, the capture of Allied bases in the western Pacific in the first weeks of the conflict meant that this offensive did not begin until mid-1944 when the long-ranged Boeing B-29 Superfortress became ready for use in combat.^[22] Operation Matterhorn involved India-based B-29s staging through bases around Chengdu in China to make a series of raids on strategic targets in Japan.^[23] This effort failed to achieve the strategic objectives that its planners had intended, largely because of logistical problems, the bomber's mechanical difficulties, the vulnerability of Chinese staging bases, and the extreme range required to reach key Japanese cities.^[24]



A B-29 over Osaka on June 1, 1945

United States Army Air Forces (USAAF) Brigadier General Haywood S. Hansell determined that Guam, Tinian, and Saipan in the Mariana Islands would better serve as B-29 bases, but they were in Japanese hands.^[25] Strategies were shifted to accommodate the air war,^[26] and the islands were captured between June and August 1944. Air bases were developed,^[27] and B-29 operations commenced from the Marianas in October 1944.^[28] These bases were easily resupplied by cargo ships.^[29] The XXI Bomber Command began missions against Japan on November 18, 1944.^[30]

The early attempts to bomb Japan from the Marianas proved just as ineffective as the China-based B-29s had been. Hansell continued the practice of conducting so-called high-altitude precision bombing, aimed at key industries and transportation networks, even after these tactics had not produced acceptable results.^[31] These efforts proved unsuccessful due to logistical difficulties with the remote location, technical problems with the new and advanced aircraft, unfavorable weather conditions, and enemy action.^{[32][33]}



The *Operation Meetinghouse* firebombing of Tokyo on the night of March 9–10, 1945, was the single deadliest air raid in history,^[34] with a greater area of fire damage and loss of life than either of the nuclear bombings of Hiroshima or Nagasaki.^{[35][36]}

Hansell's successor, Major General Curtis LeMay, assumed command in January 1945 and initially continued to use the same precision bombing tactics, with equally unsatisfactory results. The attacks initially targeted key industrial facilities but much of the Japanese manufacturing process was carried out in small workshops and private homes.^[37] Under pressure from USAAF headquarters in Washington, LeMay changed tactics and decided that low-level incendiary raids against Japanese cities were the only way to destroy their production capabilities, shifting from precision bombing to area bombardment with incendiaries.^[38]

Like most strategic bombing during World War II, the aim of the USAAF offensive against Japan was to destroy the enemy's war industries, kill or disable civilian employees of these industries, and undermine civilian morale. Civilians who took part in the war effort through such activities as building fortifications and manufacturing munitions and other war materials in factories and workshops were considered combatants in a legal sense and therefore liable to be attacked.^{[39][40]}

Over the next six months, the XXI Bomber Command under LeMay firebombed 67 Japanese cities. The firebombing of Tokyo, codenamed *Operation Meetinghouse*, on March 9–10 killed an estimated 100,000 people and destroyed 16 square miles (41 km²) of the city and 267,000 buildings in a single night. It was the deadliest bombing raid of the war, at a cost of 20 B-29s shot down by flak and fighters.^[41] By May, 75% of bombs dropped were incendiaries designed to burn down Japan's "paper cities". By mid-June, Japan's six largest cities had been devastated.^[42] The end of the fighting on Okinawa that month provided airfields even closer to the Japanese mainland, allowing the bombing campaign to be further

escalated. Aircraft flying from Allied aircraft carriers and the Ryukyu Islands also regularly struck targets in Japan during 1945 in preparation for Operation Downfall.^[43] Firebombing switched to smaller cities, with populations ranging from 60,000 to 350,000. According to Yuki Tanaka, the U.S. fire-bombed over a hundred Japanese towns and cities.^[44] These raids were also devastating.^[45]

The Japanese military was unable to stop the Allied attacks and the country's civil defense preparations proved inadequate. Japanese fighters and antiaircraft guns had difficulty engaging bombers flying at high altitude.^[46] From April 1945, the Japanese interceptors also had to face American fighter escorts based on Iwo Jima and Okinawa.^[47] That month, the Imperial Japanese Army Air Service and Imperial Japanese Navy Air Service stopped attempting to intercept the air raids in order to preserve fighter aircraft to counter the expected invasion.^[48] By mid-1945 the Japanese only occasionally scrambled aircraft to intercept individual B-29s conducting reconnaissance sorties over the country, in order to conserve supplies of fuel.^[49] By July 1945, the Japanese had stockpiled 1,156,000 US barrels (137,800,000 l; 36,400,000 US gal; 30,300,000 imp gal) of avgas for the invasion of Japan.^[50] While the Japanese military decided to resume attacks on Allied bombers from late June, by this time there were too few operational fighters available for this change of tactics to hinder the Allied air raids.^[51]

Atomic bomb development

The discovery of nuclear fission by German chemists Otto Hahn and Fritz Strassmann in 1938, and its theoretical explanation by Lise Meitner and Otto Frisch, made the development of an atomic bomb a theoretical possibility.^[52] Fears that a German atomic bomb project would develop atomic weapons first, especially among scientists who were refugees from Nazi Germany and other fascist countries, were expressed in the Einstein-Szilard letter. This prompted preliminary research in the United States in late 1939.^[53] Progress was slow until the arrival of the British MAUD Committee report in late 1941, which indicated that only 5–10 kilograms of isotopically enriched uranium-235 were needed for a bomb instead of tons of unenriched uranium and a neutron moderator (e.g. heavy water).^[54]

Working in collaboration with the United Kingdom and Canada, with their respective projects Tube Alloys and Chalk River Laboratories,^{[55][56]} the Manhattan Project, under the direction of Major General Leslie R. Groves, Jr., of the U.S. Army Corps of Engineers, designed and built the first atomic bombs.^[57] Groves appointed J. Robert Oppenheimer to organize and head the project's Los Alamos Laboratory in New Mexico, where bomb design work was carried out.^[58] Two types of bombs were eventually developed. Little Boy was a gun-type fission weapon that used uranium-235, a rare isotope of uranium separated at the Clinton Engineer Works at Oak Ridge, Tennessee.^[59] The other, known as a Fat Man device (both types named by Robert Serber), was a more powerful and efficient, but more complicated, implosion-type nuclear weapon that used plutonium created in nuclear reactors at Hanford, Washington. A test implosion weapon, the gadget, was detonated at Trinity Site, on July 16, 1945, near Alamogordo, New Mexico.^[60]

There was a Japanese nuclear weapon program, but it lacked the human, mineral and financial resources of the Manhattan Project, and never made much progress towards developing an atomic bomb.^[61]

Preparations

Organization and training

The 509th Composite Group was constituted on December 9, 1944, and activated on December 17, 1944, at Wendover Army Air Field, Utah, commanded by Colonel Paul Tibbets.^[62] Tibbets was assigned to organize and command a combat group to develop the means of delivering an atomic weapon against targets in Germany and Japan. Because the flying

squadrons of the group consisted of both bomber and transport aircraft, the group was designated as a "composite" rather than a "bombardment" unit.^[63]

Working with the Manhattan Project at Los Alamos, Tibbets selected Wendover for his training base over Great Bend, Kansas, and Mountain Home, Idaho, because of its remoteness.^[64] Each bombardier completed at least 50 practice drops of inert or conventional explosive pumpkin bombs and Tibbets declared his group combat-ready.^[65]



Aircraft of the 509th Composite Group that took part in the Hiroshima bombing. Left to right: *Big Stink*, *The Great Artiste*, *Enola Gay*



The "Tinian Joint Chiefs": Captain William S. Parsons (left), Rear Admiral William R. Purnell (center), and Brigadier General Thomas F. Farrell (right)

The 509th Composite Group had an authorized strength of 225 officers and 1,542 enlisted men, almost all of whom eventually deployed to Tinian. In addition to its authorized strength, the 509th had attached to it on Tinian 51 civilian and military personnel from Project Alberta,^[66] known as the 1st Technical Detachment.^[67] The 509th Composite Group's 393d Bombardment Squadron was equipped with 15 Silverplate B-29s. These aircraft were specially adapted to carry nuclear weapons, and were equipped with fuel-injected engines, Curtiss Electric reversible-pitch propellers, pneumatic actuators for rapid opening and closing of bomb bay doors and other improvements.^[68]

The ground support echelon of the 509th Composite Group moved by rail on April 26, 1945, to its port of embarkation at Seattle, Washington. On May 6 the support elements sailed on the SS *Cape Victory* for the Marianas, while group materiel was shipped on the SS *Emile Berliner*. The *Cape Victory* made brief port calls at Honolulu and Eniwetok but the passengers were not permitted to leave the dock area. An advance party of the air echelon, consisting of 29 officers and 61 enlisted men flew by C-54 to North Field on Tinian, between May 15 and May 22.^[69]

There were also two representatives from Washington, D.C., Brigadier General Thomas Farrell, the deputy commander of the Manhattan Project, and Rear Admiral William R. Purnell of the Military Policy Committee,^[70] who were on hand to decide higher policy matters on the spot. Along with Captain William S. Parsons, the commander of Project Alberta, they became known as the "Tinian Joint Chiefs".^[71]

Choice of targets

In April 1945, Marshall asked Groves to nominate specific targets for bombing for final approval by himself and Stimson. Groves formed a Target Committee, chaired by himself, that included Farrell, Major John A. Derry, Colonel William P. Fisher, Joyce C. Stearns and David M. Dennison from the USAAF; and scientists John von Neumann, Robert R. Wilson and William Penney from the Manhattan Project. The Target Committee met in Washington on April 27; at Los Alamos on May 10, where it was able to talk to the scientists and technicians there; and finally in Washington on May 28, where it was briefed by Tibbets and Commander Frederick Ashworth from Project Alberta, and the Manhattan Project's scientific advisor, Richard C. Tolman.^[72]

The Target Committee nominated five targets: Kokura, the site of one of Japan's largest munitions plants; Hiroshima, an embarkation port and industrial center that was the site of a major military headquarters; Yokohama, an urban center for aircraft manufacture, machine tools, docks, electrical equipment and oil refineries; Niigata, a port with industrial facilities

including steel and aluminum plants and an oil refinery; and Kyoto, a major industrial center. The target selection was subject to the following criteria:

- The target was larger than 3 mi (4.8 km) in diameter and was an important target in a large city.
- The blast would create effective damage.
- The target was unlikely to be attacked by August 1945.^[73]

These cities were largely untouched during the nightly bombing raids and the Army Air Forces agreed to leave them off the target list so accurate assessment of the weapon could be made. Hiroshima was described as "an important army depot and port of embarkation in the middle of an urban industrial area. It is a good radar target and it is such a size that a large part of the city could be extensively damaged. There are adjacent hills which are likely to produce a focusing effect which would considerably increase the blast damage. Due to rivers it is not a good incendiary target."^[73]

The Target Committee stated that "It was agreed that psychological factors in the target selection were of great importance. Two aspects of this are (1) obtaining the greatest psychological effect against Japan and (2) making the initial use sufficiently spectacular for the importance of the weapon to be internationally recognized when publicity on it is released. ... Kyoto has the advantage of the people being more highly intelligent and hence better able to appreciate the significance of the weapon. Hiroshima has the advantage of being such a size and with possible focussing from nearby mountains that a large fraction of the city may be destroyed. The Emperor's palace in Tokyo has a greater fame than any other target but is of least strategic value."^[73]

Edwin O. Reischauer, a Japan expert for the U.S. Army Intelligence Service, was incorrectly said to have prevented the bombing of Kyoto.^[73] In his autobiography, Reischauer specifically refuted this claim:

... the only person deserving credit for saving Kyoto from destruction is Henry L. Stimson, the Secretary of War at the time, who had known and admired Kyoto ever since his honeymoon there several decades earlier.^{[74][75]}

On May 30, Stimson asked Groves to remove Kyoto from the target list due to its historical, religious and cultural significance, but Groves pointed to its military and industrial significance.^[76] Stimson then approached President Harry S. Truman about the matter. Truman agreed with Stimson, and Kyoto was temporarily removed from the target list.^[77] Groves attempted to restore Kyoto to the target list in July, but Stimson remained adamant.^{[78][79]} On July 25, Nagasaki was put on the target list in place of Kyoto.^[79]

Proposed demonstration

In early May 1945, the Interim Committee was created by Stimson at the urging of leaders of the Manhattan Project and with the approval of Truman to advise on matters pertaining to nuclear energy.^[80] During the meetings on May 31 and June 1, scientist Ernest Lawrence had suggested giving the Japanese a non-combat demonstration.^[81] Arthur Compton later recalled that:



The mission runs of August 6 and 9, with Hiroshima, Nagasaki, and Kokura (the original target for August 9) displayed

It was evident that everyone would suspect trickery. If a bomb were exploded in Japan with previous notice, the Japanese air power was still adequate to give serious interference. An atomic bomb was an intricate device, still in the developmental stage. Its operation would be far from routine. If during the final adjustments of the bomb the Japanese defenders should attack, a faulty move might easily result in some kind of failure. Such an end to an advertised demonstration of power would be much worse than if the attempt had not been made. It was now evident that when the time came for the bombs to be used we should have only one of them available, followed afterwards by others at all-too-long intervals. We could not afford the chance that one of them might be a dud. If the test were made on some neutral territory, it was hard to believe that Japan's determined and fanatical military men would be impressed. If such an open test were made first and failed to bring surrender, the chance would be gone to give the shock of surprise that proved so effective. On the contrary, it would make the Japanese ready to interfere with an atomic attack if they could. Though the possibility of a demonstration that would not destroy human lives was attractive, no one could suggest a way in which it could be made so convincing that it would be likely to stop the war.^[82]

The possibility of a demonstration was raised again in the Franck Report issued by physicist James Franck on June 11 and the Scientific Advisory Panel rejected his report on June 16, saying that "we can propose no technical demonstration likely to bring an end to the war; we see no acceptable alternative to direct military use." Franck then took the report to Washington, D.C., where the Interim Committee met on June 21 to re-examine its earlier conclusions; but it reaffirmed that there was no alternative to the use of the bomb on a military target.^[83]

Like Compton, many U.S. officials and scientists argued that a demonstration would sacrifice the shock value of the atomic attack, and the Japanese could deny the atomic bomb was lethal, making the mission less likely to produce surrender. Allied prisoners of war might be moved to the demonstration site and be killed by the bomb. They also worried that the bomb might be a dud since the Trinity test was of a stationary device, not an air-dropped bomb. In addition, only two bombs would be available at the start of August, although more were in production, and they cost billions of dollars, so using one for a demonstration would be expensive.^{[84][85]}

Leaflets



Various leaflets were dropped on Japan, three versions showing the names of 11 or 12 Japanese cities targeted for destruction by firebombing. The other side contained text stating "...we cannot promise that only these cities will be among those attacked ..."^[86]

For several months, the U.S. had warned civilians of potential air raids by dropping more than 63 million leaflets across Japan. Many Japanese cities suffered terrible damage from aerial bombings; some were as much as 97% destroyed. LeMay thought that leaflets would increase the psychological impact of bombing, and reduce the international stigma of area-bombing cities. Even with the warnings, Japanese opposition to the war remained ineffective. In general, the Japanese regarded the leaflet messages as truthful, with many Japanese choosing to leave major cities. The leaflets caused such concern amongst the Empire of Japan that they ordered the arrest of anyone caught in possession of a leaflet.^{[86][87]} Leaflet texts were prepared by recent Japanese prisoners of war because they were thought to be the best choice "to appeal to their compatriots".^[88]

In preparation for dropping an atomic bomb on Hiroshima, the Oppenheimer-led Scientific Panel of the Interim Committee decided against a demonstration bomb and against a special leaflet warning. Those decisions were implemented because of the uncertainty of a successful detonation and also because of the wish to maximize shock in the leadership.^[89] No warning was given to Hiroshima that a new and much more destructive bomb was going to be dropped.^[90] Various sources gave conflicting information about

when the last leaflets were dropped on Hiroshima prior to the atomic bomb. Robert Jay Lifton wrote that it was July 27,^[90] and Theodore H. McNelly wrote that it was July 30.^[89] The USAAF history noted that eleven cities were targeted with leaflets on July 27, but Hiroshima was not one of them, and there were no leaflet sorties on July 30.^[87] Leaflet sorties were undertaken on August 1 and August 4. Hiroshima may have been leafleted in late July or early August, as survivor accounts talk about a delivery of leaflets a few days before the atomic bomb was dropped.^[90] Three versions were printed of a leaflet listing 11 or 12 cities targeted for firebombing; a total of 33 cities listed. With the text of this leaflet reading in Japanese "...we cannot promise that only these cities will be among those attacked..."^[86] Hiroshima is not listed.^{[91][92][93][94]}

Consultation with Britain and Canada

Under the 1943 Quebec Agreement with the United Kingdom, nuclear weapons would not be used against another country without mutual consent. Stimson therefore had to obtain British permission. A meeting of the Combined Policy Committee was held at the Pentagon on July 4, 1945. Stimson and Vannevar Bush represented the United States; Britain was represented by the head of the British Joint Staff Mission, Field Marshal Sir Henry Maitland Wilson; and Canada by Clarence D. Howe. In addition, Harvey Bundy, Sir James Chadwick, Groves, Lord Halifax, George L. Harrison, and Roger Makins were all present at the meeting by invitation.^[95]

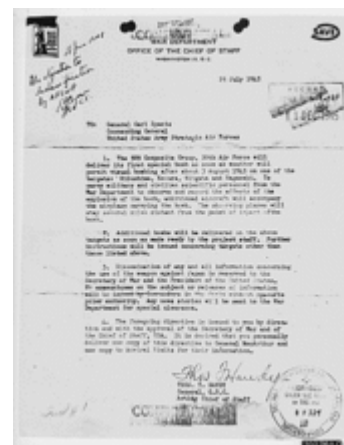
Wilson announced that the British government concurred with the use of nuclear weapons against Japan, which would be officially recorded as a decision of the Combined Policy Committee.^{[95][96][97]} As the release of information to third parties was also controlled by the Quebec Agreement, discussion then turned to what scientific details would be revealed in the press announcement of the bombing. The meeting also considered what Truman could reveal to Joseph Stalin, the leader of the Soviet Union, at the upcoming Potsdam Conference.^[95]

Orders for the attack were issued to General Carl Spaatz on July 25 under the signature of General Thomas T. Handy, the acting Chief of Staff, since Marshall was at the Potsdam Conference with Truman.^[98] That day, Truman noted in his diary that:

This weapon is to be used against Japan between now and August 10th. I have told the Sec. of War, Mr. Stimson, to use it so that military objectives and soldiers and sailors are the target and not women and children. Even if the Japs are savages, ruthless, merciless and fanatic, we as the leader of the world for the common welfare cannot drop that terrible bomb on the old capital [Kyoto] or the new [Tokyo]. He and I are in accord. The target will be a purely military one.^[99]

Potsdam Declaration

The July 16 success of the Trinity Test in the New Mexico desert exceeded expectations.^[100] On July 26, Allied leaders issued the Potsdam Declaration, which outlined the terms of surrender for Japan. The declaration was presented as an ultimatum and stated that without a surrender, the Allies would attack Japan, resulting in "the inevitable and complete destruction of the Japanese armed forces and just as inevitably the utter devastation of the Japanese homeland". The atomic bomb was not mentioned in the communiqué.^[101]



General Thomas Handy's order to General Carl Spaatz authorizing the dropping of the atomic bombs

On July 28, Japanese papers reported that the declaration had been rejected by the Japanese government. That afternoon, Prime Minister Suzuki Kantarō declared at a press conference that the Potsdam Declaration was no more than a rehash (*yakinaoshi*) of the Cairo Declaration and that the government intended to ignore it (*mokusatsu*, "kill by silence").^[102] The statement was taken by both Japanese and foreign papers as a clear rejection of the declaration. Emperor Hirohito, who was waiting for a Soviet reply to non-committal Japanese peace feelers, made no move to change the government position.^[103] Japan's willingness to surrender remained conditional on the preservation of the imperial institution; that Japan not be occupied; that the Japanese armed forces be disbanded voluntarily; and that war criminals be prosecuted by Japanese courts.^[104]

At Potsdam, Truman agreed to a request from Winston Churchill that Britain be represented when the atomic bomb was dropped. William Penney and Group Captain Leonard Cheshire were sent to Tinian, but found that LeMay would not let them accompany the mission. All they could do was send a strongly worded signal back to Wilson.^[105]

Bombs

The Little Boy bomb, except for the uranium payload, was ready at the beginning of May 1945.^[106] The uranium-235 projectile was completed on June 15, and the target insert on July 24.^[107] The target and bomb pre-assemblies (partly assembled bombs without the fissile components) left Hunters Point Naval Shipyard, California, on July 16 aboard the cruiser USS Indianapolis, and arrived on Tinian on July 26.^[108] The target inserts followed by air on July 30.^[107]

The first plutonium core, along with its polonium-beryllium urchin initiator, was transported in the custody of Project Alberta courier Raemer Schreiber in a magnesium field carrying case designed for the purpose by Philip Morrison. Magnesium was chosen because it does not act as a tamper.^[109] The core departed from Kirtland Army Air Field on a C-54 transport aircraft of the 509th Composite Group's 320th Troop Carrier Squadron on July 26, and arrived at North Field July 28. Three Fat Man high-explosive pre-assemblies, designated F31, F32, and F33, were picked up at Kirtland on July 28 by three B-29s, two from the 393d Bombardment Squadron plus one from the 216th Army Air Force Base Unit, and transported to North Field, arriving on August 2.^[110]

Hiroshima

Hiroshima during World War II

At the time of its bombing, Hiroshima was a city of both industrial and military significance. A number of military units were located nearby, the most important of which was the headquarters of Field Marshal Shunroku Hata's Second General Army, which commanded the defense of all of southern Japan,^[111] and was located in Hiroshima Castle. Hata's command consisted of some 400,000 men, most of whom were on Kyushu where an Allied invasion was correctly anticipated.^[112] Also present in Hiroshima were the headquarters of the 59th Army, the 5th Division and the 224th Division, a recently formed mobile unit.^[113] The city was defended by five batteries of 7-cm and 8-cm (2.8 and 3.1 inch) anti-aircraft guns of the 3rd Anti-Aircraft Division, including units from the 121st and 122nd Anti-Aircraft Regiments and the 22nd and 45th Separate Anti-Aircraft Battalions. In total, an estimated 40,000 Japanese military personnel were stationed in the city.^[114]



The *Enola Gay* dropped the "Little Boy" atomic bomb on Hiroshima. In this photograph are five of the aircraft's ground crew with mission commander Paul Tibbets in the center.

Hiroshima was a minor supply and logistics base for the Japanese military, but it also had large stockpiles of military supplies.^[115] The city was also a communications center, a key port for shipping and an assembly area for troops.^[76] It was a beehive of war industry, manufacturing parts for planes and boats, for bombs, rifles, and handguns; children were shown how to construct and hurl gasoline bombs and the wheelchair-bound and bedridden were assembling booby traps to be planted in the beaches of Kyushu. A new slogan appeared on the walls of Hiroshima: "FORGET SELF! ALL OUT FOR YOUR COUNTRY!"^[116] It was also the second largest city in Japan after Kyoto that was still undamaged by air raids,^[117] due to the fact that it lacked the aircraft manufacturing industry that was the XXI Bomber Command's priority target. On July 3, the Joint Chiefs of Staff placed it off limits to bombers, along with Kokura, Niigata and Kyoto.^[118]

The center of the city contained several reinforced concrete buildings and lighter structures. Outside the center, the area was congested by a dense collection of small timber-made workshops set among Japanese houses. A few larger industrial plants lay near the outskirts of the city. The houses were constructed of timber with tile roofs, and many of the industrial buildings were also built around timber frames. The city as a whole was highly susceptible to fire damage.^[119]

The population of Hiroshima had reached a peak of over 381,000 earlier in the war but prior to the atomic bombing, the population had steadily decreased because of a systematic evacuation ordered by the Japanese government. At the time of the attack, the population was approximately 340,000–350,000.^[120] Residents wondered why Hiroshima had been spared destruction by firebombing.^[121] Some speculated that the city was to be saved for U.S. occupation headquarters, others thought perhaps their relatives in Hawaii and California had petitioned the U.S. government to avoid bombing Hiroshima.^[122] More realistic city officials had ordered buildings torn down to create long, straight firebreaks, beginning in 1944.^[123] Firebreaks continued to be expanded and extended up to the morning of August 6, 1945.^[124]

Bombing of Hiroshima

Hiroshima was the primary target of the first nuclear bombing mission on August 6, with Kokura and Nagasaki as alternative targets. Having been fully briefed under the terms of Operations Order No. 35, the 393d Bombardment Squadron B-29 *Enola Gay*, piloted by Tibbets, took off from North Field, Tinian, about six hours' flight time from Japan. The *Enola Gay* (named after Tibbets' mother) was accompanied by two other B-29s. *The Great Artiste*, commanded by Major Charles Sweeney, carried instrumentation, and a then-nameless aircraft later called *Necessary Evil*, commanded by Captain George Marquardt, served as the photography aircraft.^[126]



Seizo Yamada's ground level photo taken approximately 7 km (4.3 mi) northeast of Hiroshima

Special Mission 13, Primary target Hiroshima, August 6, 1945^{[126][127]}

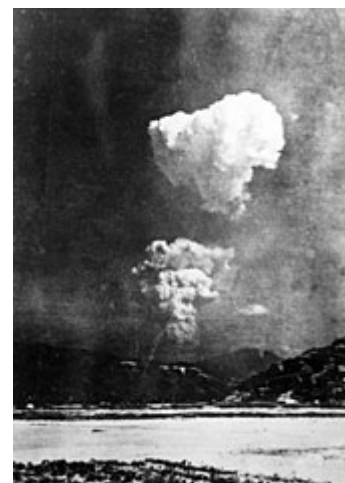
Aircraft	Pilot	Call Sign	Mission role
<i>Straight Flush</i>	Major <u>Claude R. Eatherly</u>	Dimples 85	Weather reconnaissance (Hiroshima)
<i>Jabit III</i>	Major John A. Wilson	Dimples 71	Weather reconnaissance (Kokura)
<i>Full House</i>	Major Ralph R. Taylor	Dimples 83	Weather reconnaissance (Nagasaki)
<i>Enola Gay</i>	Colonel <u>Paul W. Tibbets</u>	Dimples 82	Weapon delivery
<i>The Great Artiste</i>	Major <u>Charles W. Sweeney</u>	Dimples 89	Blast measurement instrumentation
<i>Necessary Evil</i>	Captain. George W. Marquardt	Dimples 91	Strike observation and photography
<i>Top Secret</i>	Captain Charles F. McKnight	Dimples 72	Strike spare—did not complete mission

After leaving Tinian the aircraft made their way separately to Iwo Jima to rendezvous with Sweeney and Marquardt at 05:55 at 9,200 feet (2,800 m),^[128] and set course for Japan. The aircraft arrived over the target in clear visibility at 31,060 feet (9,470 m).^[129] Parsons, who was in command of the mission, armed the bomb during the flight to minimize the risks during takeoff. He had witnessed four B-29s crash and burn at takeoff, and feared that a nuclear explosion would occur if a B-29 crashed with an armed Little Boy on board.^[130] His assistant, Second Lieutenant Morris R. Jeppson, removed the safety devices 30 minutes before reaching the target area.^[131]

During the night of August 5–6, Japanese early warning radar detected the approach of numerous American aircraft headed for the southern part of Japan. Radar detected 65 bombers headed for Saga, 102 bound for Maebashi, 261 en route to Nishinomiya, 111 headed for Ube and 66 bound for Imabari. An alert was given and radio broadcasting stopped in many cities, among them Hiroshima. The all-clear was sounded in Hiroshima at 00:05.^[132] About an hour before the bombing, the air raid alert was sounded again, as *Straight Flush* flew over the city. It broadcast a short message which was picked up by *Enola Gay*. It read: "Cloud cover less than 3/10th at all altitudes. Advice: bomb primary."^[133] The all-clear was sounded over Hiroshima again at 07:09.^[134]

At 08:09, Tibbets started his bomb run and handed control over to his bombardier, Major Thomas Ferebee.^[135] The release at 08:15 (Hiroshima time) went as planned, and the Little Boy containing about 64 kg (141 lb) of uranium-235 took 44.4 seconds to fall from the aircraft flying at about 31,000 feet (9,400 m) to a detonation height of about 1,900 feet (580 m) above the city.^{[136][137]} *Enola Gay* traveled 11.5 mi (18.5 km) before it felt the shock waves from the blast.^[138]

Due to crosswind, the bomb missed the aiming point, the Aioi Bridge, by approximately 800 ft (240 m) and detonated directly over Shima Surgical Clinic^[144] at 34.39468°N 132.45462°E. It released the equivalent energy of 16 kilotons of TNT (67 TJ), \pm 2 kt.^[136] The weapon was considered very inefficient, with only 1.7% of its material fissioning.^[145] The radius of total destruction was about 1 mile (1.6 km), with resulting fires across 4.4 square miles (11 km²).^[146]



Picture found in Honkawa Elementary School in 2013 of the Hiroshima atom bomb cloud, stated by some books and the Hiroshima Peace Museum as having been taken about 30 minutes after detonation from about 10 km (6.2 mi) east of the hypocenter. However, experience on how quickly such clouds dissipate and comparisons to other photos puts this frame at 2-3 minutes after detonation, not 30 minutes.^[125]

People on the ground reported seeing a *pika* (ピカ)—a brilliant flash of light—followed by a *don* (ドン)—a loud booming sound.^[147] Some 70,000–80,000 people, or around 30% of the population of Hiroshima, were killed by the blast and resultant firestorm,^{[148][149]} and another 70,000 were injured.^[150] Perhaps as many as 20,000 Japanese military personnel were killed.^[151]

Enola Gay stayed over the target area for two minutes and was ten miles away when the bomb detonated. Only Tibbets, Parsons, and Ferebee knew of the nature of the weapon; the others on the bomber were only told to expect a blinding flash and given black goggles. "It was hard to believe what we saw", Tibbets told reporters, while Parsons said "the whole thing was tremendous and awe-inspiring ... the men aboard with me gasped 'My God'". He and Tibbets compared the shockwave to "a close burst of ack-ack fire".^[152]

Events on the ground

Some of the reinforced concrete buildings in Hiroshima had been very strongly constructed because of the earthquake danger in Japan, and their framework did not collapse even though they were fairly close to the blast center. Since the bomb detonated in the air, the blast was directed more downward than sideways, which was largely responsible for the survival of the *Prefectural Industrial Promotional Hall*, now commonly known as the *Genbaku* (A-bomb) dome. This building was designed and built by the Czech architect *Jan Letzel*, and was only 150 m (490 ft) from ground zero. The ruin was named *Hiroshima Peace Memorial* and was made a UNESCO *World Heritage Site* in 1996 over the objections of the United States and China, which expressed reservations on the grounds that other Asian nations were the ones who suffered the greatest loss of life and property, and a focus on Japan lacked historical perspective.^[153]

U.S. surveys estimated that 4.7 square miles (12 km²) of the city were destroyed. Japanese officials determined that 69% of Hiroshima's buildings were destroyed and another 6–7% damaged.^[154] The bombing started fires that spread rapidly through timber and paper homes. As in other Japanese cities, the firebreaks proved ineffective.^[155]



For decades this "Hiroshima strike" photo was misidentified as the mushroom cloud of the bomb that formed at c. 08:16.^{[139][140]} However, due to its much greater height, the scene was identified by a researcher in March 2016 as the firestorm-cloud that engulfed the city,^[140] a fire that reached its peak intensity some three hours after the bomb.^[141] The image with the incorrect description featured prominently in the Hiroshima Peace Museum up to 2016,^[140] though not cited, it had much earlier, also been mis-attributed and presented to the public in 1955 by US artists, with the world-touring *The Family of Man* exhibition. Without knowledge of the photo the output of energy from the fuel in the city, necessary to loft a stratospheric firestorm-cloud, had been estimated as 1000 times the energy of the bomb.^[141] Post March estimates using the height of this Hiroshima-cloud also point at the underlying firestorm releasing approximately 1000 times the energy of the bomb.^[140] Twenty minutes after detonation, during the formation of this firestorm, soot filled black rain began to fall on survivors.^[142] Scientist Alan Robock suggests that 100 of these firestorm-clouds would create a *small* "nuclear winter", 1-2 C of global cooling.^[143]

Hiroshima bombing



Hiroshima in the



Strike order for the

aftermath of the
bombing

Hiroshima bombing as
posted on August 5,
1945



Injured civilian
casualties



The Hiroshima
Genbaku Dome after
the bombing



The greater absorption
of thermal energy by
dark colors resulted in
the clothes pattern, in
the tight-fitting areas
on this survivor, being
burnt into the skin.



Direct, thermal flash
burns. Survivor is
standing as the burn is
of very shallow depth;
unlike burns from hot
convective material,
the heat transfer rate
from thermal radiation
is low.



22-year old victim
Toyoko Kugata being
treated at the
Hiroshima Red Cross
Hospital (October 6,
1945)

Eizō Nomura was the closest known survivor, being in the basement of a reinforced concrete building (it remained as the *Rest House* after the war) only 170 metres (560 ft) from ground zero (the hypocenter) at the time of the attack.^{[156][157]} He lived into his 80s.^{[158][159]} Akiko Takakura was among the closest survivors to the hypocenter of the blast. She had been in the solidly built Bank of Hiroshima only 300 meters (980 ft) from ground-zero at the time of the attack.^[160]

Over 90% of the doctors and 93% of the nurses in Hiroshima were killed or injured—most had been in the downtown area which received the greatest damage.^[161] The hospitals were destroyed or heavily damaged. Only one doctor, Terufumi Sasaki, remained on duty at the Red Cross Hospital.^[155] Nonetheless, by early afternoon, the police and volunteers had established evacuation centres at hospitals, schools and tram stations, and a morgue was established in the Asano library.^[162]

Most elements of the Japanese Second General Army headquarters were at physical training on the grounds of Hiroshima Castle, barely 900 yards (820 m) from the hypocenter. The attack killed 3,243 troops on the parade ground.^[163] The communications room of Chugoku Military District Headquarters that was responsible for issuing and lifting air raid warnings was in a semi-basement in the castle. Yoshie Oka, a Hijiyama Girls High School student who had been conscripted/mobilized to serve as a communications officer had just sent a message that the alarm had been issued for Hiroshima and neighboring Yamaguchi, when the bomb exploded. She used a special phone to inform Fukuyama Headquarters (some 100 km away) that "Hiroshima has been attacked by a new type of bomb. The city is in a state of near-total destruction."^[164]

Since Mayor Senkichi Awaya had been killed while eating breakfast with his son and granddaughter at the mayoral residence, Field Marshal Hata, who was only slightly wounded, took over the administration of the city, and coordinated relief efforts. Many of his staff had been killed or fatally wounded, including a Korean prince of the Joseon Dynasty, Yi Wu, who was serving as a lieutenant colonel in the Japanese Army.^{[165][166]} Hata's senior surviving staff officer was the wounded Colonel Kumao Imoto, who acted as his chief of staff. Soldiers from the undamaged Hiroshima Ujina Harbor used suicide boats, intended to repel the American invasion, to collect the wounded and take them down the rivers to the military hospital at Ujina.^[167] Trucks and trains brought in relief supplies and evacuated survivors from the city.^[168]

Twelve American airmen were imprisoned at the Chugoku Military Police Headquarters located about 1,300 feet (400 m) from the hypocenter of the blast.^[169] Most died instantly, although two were reported to have been executed by their captors, and two prisoners badly injured by the bombing were left next to the Aioi Bridge by the Kempei Tai, where they

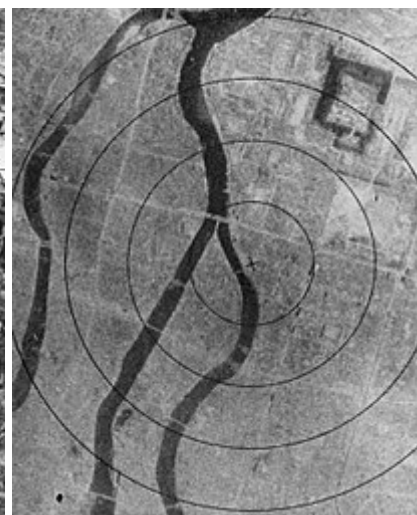
were stoned to death.^{[170][171]} Eight U.S. prisoners of war killed as part of the medical experiments program at Kyushu University were falsely reported by Japanese authorities as having been killed in the atomic blast as part of an attempted cover up.^[172]

Japanese realization of the bombing

The Tokyo control operator of the Japan Broadcasting Corporation noticed that the Hiroshima station had gone off the air. He tried to re-establish his program by using another telephone line, but it too had failed.^[173] About 20 minutes later the Tokyo railroad telegraph center realized that the main line telegraph had stopped working just north of Hiroshima. From some small railway stops within 16 km (10 mi) of the city came unofficial and confused reports of a terrible explosion in Hiroshima. All these reports were transmitted to the headquarters of the Imperial Japanese Army General Staff.^[174]



Hiroshima before the bombing



Hiroshima after the bombing and firestorm

Military bases repeatedly tried to call the Army Control Station in Hiroshima. The complete silence from that city puzzled the General Staff; they knew that no large enemy raid had occurred and that no sizable store of explosives was in Hiroshima at that time. A young officer was instructed to fly immediately to Hiroshima, to land, survey the damage, and return to Tokyo with reliable information for the staff. It was felt that nothing serious had taken place and that the explosion was just a rumor.^[174]

The staff officer went to the airport and took off for the southwest. After flying for about three hours, while still nearly 160 km (100 mi) from Hiroshima, he and his pilot saw a great cloud of smoke from the bomb. After circling the city in order to survey the damage they landed south of the city, where the staff officer, after reporting to Tokyo, began to organize relief measures. Tokyo's first indication that the city had been destroyed by a new type of bomb came from President Truman's announcement of the strike, sixteen hours later.^[174]

Events of August 7–9

After the Hiroshima bombing, Truman issued a statement announcing the use of the new weapon. He stated, "We may be grateful to Providence" that the German atomic bomb project had failed, and that the United States and its allies had "spent two billion dollars on the greatest scientific gamble in history—and won". Truman then warned Japan: "If they do not now accept our terms, they may expect a rain of ruin from the air, the like of which has never been seen on this earth. Behind this air attack will follow sea and land forces in such numbers and power as they have not yet seen and with the fighting skill of which they are already well aware."^[175] This was a widely broadcast speech picked up by Japanese news agencies.^[176]



Truman announcing the bombing of Hiroshima

0:00

MENU

President Truman announces the bombing of Hiroshima.

Problems playing this file? See [media help](#).



Leaflet AB12,^[177] with information on the Hiroshima bomb and a warning to civilians to petition the Emperor to surrender was dropped over Japan beginning on August 9,^[177] by the 509th Composite Group on the bombing mission. Although it is not identified by them, an AB11 is in the possession of the Nagasaki Atomic Bomb Museum.^[178]

By August 8,^[179] the 50,000-watt standard wave station on Saipan, the OWI radio station, broadcast a similar message to Japan every 15 minutes about Hiroshima, stating that more Japanese cities would face a similar fate in the absence of immediate acceptance of the terms of the Potsdam Declaration and emphatically urged civilians to evacuate major cities. Radio Japan, which continued to extoll victory for Japan by never surrendering,^[86] had informed the Japanese of the destruction of Hiroshima by a single bomb.^[180]

Prime Minister Suzuki felt compelled to meet the Japanese press, to whom he reiterated his government's commitment to ignore the Allies' demands and fight on.^[181] The Japanese government did not react. Emperor Hirohito, the government, and the war council considered four conditions for surrender: the preservation of the *kokutai* (Imperial institution and national polity), assumption by the Imperial Headquarters of responsibility for disarmament and demobilization, no occupation of the Japanese Home Islands, Korea, or Formosa, and delegation of the punishment of war criminals to the Japanese government.^[182]

Soviet Foreign Minister Vyacheslav Molotov informed Tokyo of the Soviet Union's unilateral abrogation of the Soviet–Japanese Neutrality Pact on August 5. At two minutes past midnight on August 9, Tokyo time, Soviet infantry, armor, and air forces had launched the Manchurian Strategic Offensive Operation.^[183] Four hours later, word reached Tokyo of the Soviet Union's official declaration of war. The senior leadership of the Japanese Army began preparations to impose martial law on the nation, with the support of Minister of War Korechika Anami, in order to stop anyone attempting to make peace.^[184]

On August 7, a day after Hiroshima was destroyed, Dr. Yoshio Nishina and other atomic physicists arrived at the city, and carefully examined the damage. They then went back to Tokyo and told the cabinet that Hiroshima was indeed destroyed by an atomic bomb. Admiral Soemu Toyoda, the Chief of the Naval General Staff, estimated that no more than one or two additional bombs could be readied, so they decided to endure the remaining attacks, acknowledging "there would be more destruction but the war would go on".^[185] American Magic codebreakers intercepted the cabinet's messages.^[186]

Purnell, Parsons, Tibbets, Spaatz, and LeMay met on Guam that same day to discuss what should be done next.^[187] Since there was no indication of Japan surrendering,^[186] they decided to proceed with dropping another bomb. Parsons said that Project Alberta would have it ready by August 11, but Tibbets pointed to weather reports indicating poor flying conditions on that day due to a storm, and asked if the bomb could be readied by August 9. Parsons agreed to try to do so.^{[188][187]}

Nagasaki

Nagasaki during World War II

The city of Nagasaki had been one of the largest seaports in southern Japan, and was of great wartime importance because of its wide-ranging industrial activity, including the production of ordnance, ships, military equipment, and other war materials. The four largest companies in the city were Mitsubishi Shipyards, Electrical Shipyards, Arms Plant, and Steel and Arms Works, which employed about 90% of the city's labor force, and accounted for 90% of the city's industry.^[189] Although an important industrial city, Nagasaki had been spared from firebombing because its geography made it difficult

to locate at night with AN/APQ-13 radar.^[118]

Unlike the other target cities, Nagasaki had not been placed off limits to bombers by the Joint Chiefs of Staff's July 3 directive,^{[118][190]} and was bombed on a small scale five times. During one of these raids on August 1, a number of conventional high-explosive bombs were dropped on the city. A few hit the shipyards and dock areas in the southwest portion of the city, and several hit the Mitsubishi Steel and Arms Works.^[189] By early August, the city was defended by the 134th Anti-Aircraft Regiment of the 4th Anti-Aircraft Division with four batteries of 7 cm (2.8 in) anti-aircraft guns and two searchlight batteries.^[114]

In contrast to Hiroshima, almost all of the buildings were of old-fashioned Japanese construction, consisting of timber or timber-framed buildings with timber walls (with or without plaster) and tile roofs. Many of the smaller industries and business establishments were also situated in buildings of timber or other materials not designed to withstand explosions. Nagasaki had been permitted to grow for many years without conforming to any definite city zoning plan; residences were erected adjacent to factory buildings and to each other almost as closely as possible throughout the entire industrial valley. On the day of the bombing, an estimated 263,000 people were in Nagasaki, including 240,000 Japanese residents, 10,000 Korean residents, 2,500 conscripted Korean workers, 9,000 Japanese soldiers, 600 conscripted Chinese workers, and 400 Allied prisoners of war in a camp to the north of Nagasaki.^{[191][192]}

Bombing of Nagasaki

Responsibility for the timing of the second bombing was delegated to Tibbets. Scheduled for August 11 against Kokura, the raid was moved earlier by two days to avoid a five-day period of bad weather forecast to begin on August 10.^[193] Three bomb pre-assemblies had been transported to Tinian, labeled F-31, F-32, and F-33 on their exteriors. On August 8, a dress rehearsal was conducted off Tinian by Sweeney using *Bockscar* as the drop airplane. Assembly F-33 was expended testing the components and F-31 was designated for the August 9 mission.^[194]

Special Mission 16, Secondary target Nagasaki, August 9, 1945^[195]

Aircraft	Pilot	Call Sign	Mission role
<u><i>Enola Gay</i></u>	Captain George W. Marquardt	Dimples 82	Weather reconnaissance (Kokura)
<u><i>Laggin' Dragon</i></u>	Captain Charles F. McKnight	Dimples 95	Weather reconnaissance (Nagasaki)
<u><i>Bockscar</i></u>	Major <u>Charles W. Sweeney</u>	Dimples 77	Weapon delivery
<u><i>The Great Artiste</i></u>	Captain <u>Frederick C. Bock</u>	Dimples 89	Blast measurement instrumentation
<u><i>Big Stink</i></u>	Major James I. Hopkins, Jr.	Dimples 90	Strike observation and photography
<u><i>Full House</i></u>	Major Ralph R. Taylor	Dimples 83	Strike spare—did not complete mission

At 03:49 on the morning of August 9, 1945, *Bockscar*, flown by Sweeney's crew, carried Fat Man, with Kokura as the primary target and Nagasaki the secondary target. The mission plan for the second attack was nearly identical to that of the Hiroshima mission, with two B-29s flying an hour ahead as weather scouts and two additional B-29s in Sweeney's flight for instrumentation and photographic support of the mission. Sweeney took off with his weapon already armed but with the electrical safety plugs still engaged.^[196]



The *Bockscar* and its crew, who dropped the Fat Man atomic bomb on Nagasaki



Strike order for the Nagasaki bombing as posted August 8, 1945

During pre-flight inspection of *Bockscar*, the flight engineer notified Sweeney that an inoperative fuel transfer pump made it impossible to use 640 US gallons (2,400 l; 530 imp gal) of fuel carried in a reserve tank. This fuel would still have to be carried all the way to Japan and back, consuming still more fuel. Replacing the pump would take hours; moving the Fat Man to another aircraft might take just as long and was dangerous as well, as the bomb was live. Tibbets and Sweeney therefore elected to have *Bockscar* continue the mission.^{[197][198]}

This time Penney and Cheshire were allowed to accompany the mission, flying as observers on the third plane, *Big Stink*, flown by the group's operations officer, Major James I. Hopkins, Jr. Observers aboard the weather planes reported both targets clear. When Sweeney's aircraft arrived at the assembly point for his flight off the coast of Japan, *Big Stink* failed to make the rendezvous.^[196] According to Cheshire, Hopkins was at varying heights including 9,000 feet (2,700 m) higher than he should have been, and was not flying tight circles over Yakushima as previously agreed with Sweeney and Captain Frederick C. Bock, who was piloting the support B-29 *The Great Artiste*. Instead, Hopkins was flying 40-mile (64 km) dogleg patterns.^[199] Though ordered not to circle longer than fifteen minutes, Sweeney continued to wait for *Big Stink* for forty minutes. Before leaving the rendezvous point, Sweeney consulted Ashworth, who was in

charge of the bomb. As commander of the aircraft, Sweeney made the decision to proceed to the primary, the city of Kokura.^[200]

After exceeding the original departure time limit by nearly a half-hour, *Bockscar*, accompanied by *The Great Artiste*, proceeded to Kokura, thirty minutes away. The delay at the rendezvous had resulted in clouds and drifting smoke over Kokura from fires started by a major firebombing raid by 224 B-29s on nearby Yahata the previous day. Additionally, the Yawata Steel Works intentionally burned coal tar, to produce black smoke.^[201] The clouds and smoke resulted in 70% of the area over Kokura being covered, obscuring the aiming point. Three bomb runs were made over the next 50 minutes, burning fuel and exposing the aircraft repeatedly to the heavy defenses around Kokura, but the bombardier was unable to drop visually. By the time of the third bomb run, Japanese antiaircraft fire was getting close, and Second Lieutenant Jacob Beser, who was monitoring Japanese communications, reported activity on the Japanese fighter direction radio bands.^[202]

After three runs over the city, and with fuel running low because of the failed fuel pump, they headed for their secondary target, Nagasaki.^[196] Fuel consumption calculations made en route indicated that *Bockscar* had insufficient fuel to reach Iwo Jima and would be forced to divert to Okinawa, which had become entirely Allied-occupied territory only six weeks earlier. After initially deciding that if Nagasaki were obscured on their arrival the crew would carry the bomb to Okinawa and dispose of it in the ocean if necessary, Ashworth agreed with Sweeney's suggestion that a radar approach would be used if the target was obscured.^{[203] [204]}

At about 07:50 Japanese time, an air raid alert was sounded in Nagasaki, but the "all clear" signal was given at 08:30. When only two B-29 Superfortresses were sighted at 10:53, the Japanese apparently assumed that the planes were only on reconnaissance and no further alarm was given.^[205]

A few minutes later at 11:00, *The Great Artiste* dropped instruments attached to three parachutes. These instruments also contained an unsigned letter to Professor Ryokichi Sagane, a physicist at the University of Tokyo who studied with three of the scientists responsible for the atomic bomb at the University of California, Berkeley, urging him to tell the public about the danger involved with these weapons of mass destruction. The messages were found by military authorities but not turned over to Sagane until a month later.^[206] In 1949, one of the authors of the letter, Luis Alvarez, met with Sagane and signed the document.^[207]

At 11:01, a last-minute break in the clouds over Nagasaki allowed *Bockscar's* bombardier, Captain Kermit Beahan, to visually sight the target as ordered. The Fat Man weapon, containing a core of about 5 kg (11 lb) of plutonium, was dropped over the city's industrial valley at 32.77372°N $129.86325^{\circ}\text{E}$. It exploded 47 seconds later at $1,650 \pm 33$ ft (503 ± 10 m), above a tennis court^[208] halfway between the Mitsubishi Steel and Arms Works in the south and the Nagasaki Arsenal in the north. This was nearly 3 km (1.9 mi) northwest of the planned hypocenter; the blast was confined to the Urakami Valley and a major portion of the city was protected by the intervening hills.^[209] The resulting explosion released the equivalent energy of 21 ± 2 kt (87.9 ± 8.4 TJ).^[136] The explosion generated temperatures inside the fireball estimated at $3,900^{\circ}\text{C}$ ($7,050^{\circ}\text{F}$) and winds that were estimated at over 1,000 km/h (620 mph).^{[210][211]}

Big Stink spotted the explosion from a hundred miles away, and flew over to observe.^[212] Because of the delays in the mission and the inoperative fuel transfer pump, *Bockscar* did not have sufficient fuel to reach the emergency landing field at Iwo Jima, so Sweeney and Bock flew to Okinawa. Arriving there critically short on fuel, Sweeney only had enough fuel for a single approach. He tried repeatedly to contact the control tower for landing clearance, but received no answer. Sweeney could see heavy air traffic landing and taking off from Okinawa's Yontan Airfield. Firing off every flare on board to alert the field to his emergency landing, the "Bockscar" came in fast, landing at 140 miles per hour (230 km/h) instead of the normal 120 miles per hour (190 km/h). The number two engine died from fuel starvation as *Bockscar* began its final approach. Touching down midway down the landing strip, *Bockscar* bounced up into the air again for about 25 feet before slamming back down hard. The heavy B-29 slewed left and towards a row of parked B-24 bombers before the pilots managed to regain control. The B-29's reversible propellers were insufficient to slow the aircraft adequately, and with both pilots standing on the brakes, *Bockscar* made a swerving 90-degree turn at the end of the runway to avoid running off it. A second engine died from fuel exhaustion by the time the plane came to a stop. The flight engineer later measured fuel in the tanks and concluded that less than five minutes total remained.^[213]

Following the mission, there was confusion over the identification of the plane. The first eyewitness account by war correspondent William L. Laurence of *The New York Times*, who accompanied the mission aboard the aircraft piloted by Bock, reported that Sweeney was leading the mission in *The Great Artiste*. He also noted its "Victor" number as 77, which was that of *Bockscar*.^[214] Laurence had interviewed Sweeney and his crew, and was aware that they referred to their airplane as *The Great Artiste*. Except for *Enola Gay*, none of the 393d's B-29s had yet had names painted on the noses, a fact which Laurence himself noted in his account. Unaware of the switch in aircraft, Laurence assumed Victor 77 was *The Great Artiste*,^[215] which was in fact, Victor 89.^[216]

Events on the ground

Although the bomb was more powerful than the one used on Hiroshima, the effect was confined by hillsides to the narrow Urakami Valley.^[217] Of 7,500 Japanese employees who worked inside the Mitsubishi Munitions plant, including "mobilized"/conscripted students and regular workers, 6,200 were killed. Some 17,000–22,000 others who worked in other war plants and factories in the city died as well.^[218] Casualty estimates for immediate deaths vary widely, ranging from 22,000 to 75,000^[218] At least 35,000–40,000 people were killed and 60,000 others injured.^{[219][220][221][222]} In the days and months following the explosion, more people died from bomb effects. Because of the presence of undocumented foreign workers, and a number of military personnel in transit, there are great discrepancies in the estimates of total



Nagasaki before and after the bombing and the fires had long since burnt out



A photograph of Sumiteru Taniguchi's back injuries taken in January 1946 by a U.S. Marine photographer

deaths by the end of 1945; a range of 39,000 to 80,000 can be found in various studies.^{[120][222]}

Unlike Hiroshima's military death toll, only 150 Japanese soldiers were killed instantly, including thirty-six from the 134th AAA Regiment of the 4th AAA Division.^{[114][223]} At least eight known POWs died from the bombing and as many as 13 may have died, including a British prisoner of war, Royal Air Force

Corporal Ronald Shaw,^[224] and seven Dutch POWs.^[225] One American POW, Joe Kieyoomia, was in Nagasaki at the time of the bombing but survived, reportedly having been shielded from the effects of the bomb by the concrete walls of his cell.^[226] There were 24 Australian POWs in Nagasaki, all of whom survived.^[227]

The radius of total destruction was about 1 mi (1.6 km), followed by fires across the northern portion of the city to 2 mi (3.2 km) south of the bomb.^{[146][228]} About 58% of the Mitsubishi Arms Plant was damaged, and about 78% of the Mitsubishi Steel Works. The Mitsubishi Electric Works suffered only 10% structural damage as it was on the border of the main destruction zone. The Nagasaki Arsenal was destroyed in the blast.^[229]

Although many fires likewise burnt following the bombing, in contrast to Hiroshima where sufficient fuel density was available, no firestorm developed in Nagasaki as the damaged areas did not furnish enough fuel to generate the phenomenon. Instead, the ambient wind at the time pushed the fire spread along the valley.^[230]

Plans for more atomic attacks on Japan



The Nagasaki Prefecture Report on the bombing characterized Nagasaki as "like a graveyard with not a tombstone standing".^[231]

Groves expected to have another atomic bomb ready for use on August 19, with three more in September and a further three in October.^[85] On August 10, he sent a memorandum to Marshall in which he wrote that "the next bomb ... should be ready for delivery on the first suitable weather after 17 or 18 August." On the same day, Marshall endorsed the memo with the comment, "It is not to be released over Japan without express authority from the President."^[85] Truman had secretly requested this on August 10. This modified the previous order that the target cities were to be attacked with atomic bombs "as made ready".^[232]

There was already discussion in the War Department about conserving the bombs then in production for Operation Downfall. "The problem now [August 13] is whether or not, assuming the Japanese do not capitulate, to continue dropping them every time one is made and shipped out there or whether to hold them ... and then pour them all on in a reasonably short time. Not all in

one day, but over a short period. And that also takes into consideration the target that we are after. In other words, should we not concentrate on targets that will be of the greatest assistance to an invasion rather than industry, morale, psychology, and the like? Nearer the tactical use rather than other use."^[85]



Urakami Tenshudo (Catholic Church in Nagasaki) destroyed by the bomb, the dome/bell of the church, at right, having toppled off

Two more Fat Man assemblies were readied, and scheduled to leave Kirtland Field for Tinian on August 11 and 14,^[233] and Tibbets was ordered by LeMay to return to Albuquerque, New Mexico, to collect them.^[234] At Los Alamos, technicians worked 24 hours straight to cast another plutonium core.^[235] Although cast, it still needed to be pressed and coated, which would take until August 16.^[236] Therefore, it could have been ready for use on August 19. Unable to reach Marshall, Groves ordered on his own authority on August 13 that the core should not be shipped.^[232]

Surrender of Japan and subsequent occupation

Until August 9, Japan's war council still insisted on its four conditions for surrender. On that day Hirohito ordered Kōichi Kido to "quickly control the situation ... because the Soviet Union has declared war against us." He then held an Imperial conference during which he authorized minister Shigenori Tōgō to notify the Allies that Japan would accept their terms on one condition, that the declaration "does not comprise any demand which prejudices the prerogatives of His Majesty as a Sovereign ruler."^[237]

On August 12, the Emperor informed the imperial family of his decision to surrender. One of his uncles, Prince Asaka, then asked whether the war would be continued if the *kokutai* could not be preserved. Hirohito simply replied, "Of course."^[238] As the Allied terms seemed to leave intact the principle of the preservation of the Throne, Hirohito recorded on August 14 his capitulation announcement which was broadcast to the Japanese nation the next day despite a short rebellion by militarists opposed to the surrender.^[239]

In his declaration, Hirohito referred to the atomic bombings:

Moreover, the enemy now possesses a new and terrible weapon with the power to destroy many innocent lives and do incalculable damage. Should we continue to fight, not only would it result in an ultimate collapse and obliteration of the Japanese nation, but also it would lead to the total extinction of human civilization.

Such being the case, how are we to save the millions of our subjects, or to atone ourselves before the hallowed spirits of our imperial ancestors? This is the reason why we have ordered the acceptance of the provisions of the joint declaration of the powers.^[240]

In his "Rescript to the Soldiers and Sailors" delivered on August 17, he stressed the impact of the Soviet invasion on his decision to surrender.^[241] Hirohito met with General MacArthur on September 27, saying to him that "the peace party did not prevail until the bombing of Hiroshima created a situation which could be dramatized". Furthermore, the "Rescript to the Soldiers and Sailors" speech he told MacArthur about was just personal, not political, and never stated that the Soviet intervention in Manchuria was the main reason for surrender. In fact, a day after the bombing of Nagasaki and the Soviet invasion of Manchuria, Hirohito ordered his advisers, primarily Chief Cabinet Secretary Hisatsune Sakomizu, Kawada Mizuho, and Masahiro Yasuoka, to write up a surrender speech. In Hirohito's speech, days before announcing it on radio on August 15, he gave three major reasons for surrender: Tokyo's defenses would not be complete before the American invasion of Japan, Ise Shrine would be lost to the Americans, and atomic weapons deployed by the Americans would lead to the death of the entire Japanese race. Despite the Soviet intervention, Hirohito did not mention the Soviets as the main factor for surrender.^[242]

Depiction, public response, and censorship

During the war, the British embassy in Washington reported that Americans regarded the Japanese as "a nameless mass of vermin";^[243] caricatures depicting Japanese as less than human, e.g. monkeys, were common.^[244] A 1944 opinion poll that asked what should be done with Japan found that 13% of the U.S. public were in favor of "killing off" all Japanese people.^{[245][246]}

After the Hiroshima bomb detonated successfully, Oppenheimer addressed an assembly at Los Alamos "clasping his hands together like a prize-winning boxer".^[247] The bombing amazed Otto Hahn and other German atomic scientists the British held at Farm Hall in Operation Epsilon. Hahn stated that he had not believed an atomic weapon "would be possible for another twenty years"; Werner Heisenberg did not believe the news at first. Carl Friedrich von Weizsäcker said "I think it's dreadful of the Americans to have done it. I think it is madness on their part", but Heisenberg replied, "One could equally well say 'That's the quickest way of ending the war'". Hahn was grateful that the German project had not succeeded in developing "such an inhumane weapon"; Karl Wirtz observed that even if it had, "we would have obliterated London but would still not have conquered the world, and then they would have dropped them on us".^[248]



Life among the rubble in Hiroshima in March and April 1946. Film footage taken by Lieutenant Daniel A. McGovern (director) and Harry Mimura (cameraman) for a United States Strategic Bombing Survey project.

Hahn told the others, "Once I wanted to suggest that all uranium should be sunk to the bottom of the ocean".^[248] The Vatican agreed; L'Osservatore Romano expressed regret that the bomb's inventors did not destroy the weapon for the benefit of humanity.^[249] Rev. Cuthbert Thicknesse, the Dean of St Albans, prohibited using St Albans Abbey for a thanksgiving service for the war's end, calling the use of atomic weapons "an act of wholesale, indiscriminate massacre".^[250] Nonetheless, news of the atomic bombing was greeted enthusiastically in the U.S.; a poll in Fortune magazine in late 1945 showed a significant minority of Americans (22.7%) wishing that more atomic bombs could have been dropped on Japan.^{[251][252]} The initial positive response was supported by the imagery presented to the public (mainly the powerful images of the mushroom cloud) and the censorship of photographs that showed corpses and maimed survivors.^[251] Such "censorship" was however the status-quo at the time, with no major news outlets depicting corpses or maimed survivors as a result from other events, US or otherwise.^[253]

On August 10, 1945, the day after the Nagasaki bombing, Yōsuke Yamahata, correspondent Higashi and artist Yamada arrived in the city with orders to record the destruction for maximum propaganda purposes, Yamahata took scores of photographs and on August 21 they appeared in Mainichi Shimbun, a popular Japanese newspaper.^[254] Wilfred Burchett was the first western journalist to visit Hiroshima after the atom bomb was dropped, arriving alone by train from Tokyo on September 2, the day of the formal surrender aboard the USS Missouri. His Morse code dispatch was printed by the Daily Express newspaper in London on September 5, 1945, entitled "The Atomic Plague", the first public report to mention the effects of radiation and nuclear fallout.^[255] Burchett's reporting was unpopular with the U.S. military. The U.S. censors suppressed a supporting story submitted by George Weller of the Chicago Daily News, and accused Burchett of being under the sway of Japanese propaganda. Laurence dismissed the reports on radiation sickness as Japanese efforts to undermine American morale, ignoring his own account of Hiroshima's radiation sickness published one week earlier.^[256]

A member of the U.S. Strategic Bombing Survey, Lieutenant Daniel McGovern, used a film crew to document the results in early 1946.^[257] The film crew's work resulted in a three-hour documentary entitled *The Effects of the Atomic Bombs Against Hiroshima and Nagasaki*. The documentary included images from hospitals showing the human effects of the bomb; it showed burned out buildings and cars, and rows of skulls and bones on the ground. It was classified "secret" for the next 22 years.^[258] During this time in America, it was a common practice for editors to keep graphic images of death out of films, magazines, and newspapers.^[253] The total of 90,000 ft (27,000 m) of film shot by McGovern's cameramen had not been fully aired as of 2009. According to Greg Mitchell, with the 2004 documentary film *Original Child Bomb*, a



The Hiroshima ruins in March and April 1946, by Daniel A. McGovern and Harry Mimura

small part of that footage managed to reach part of the American public "in the unflinching and powerful form its creators intended".^[257]

Motion picture company Nippon Eigasha started sending cameramen to Nagasaki and Hiroshima in September 1945. On October 24, 1945, a U.S. military policeman stopped a Nippon Eigasha cameraman from continuing to film in Nagasaki. All Nippon Eigasha's reels were then confiscated by the American authorities. These reels were in turn requested by the Japanese government, declassified, and saved from oblivion. Some black-and-white motion pictures were released and shown for the first time to Japanese and American audiences in the years from 1968 to 1970.^[257] The public release of film footage of the city post-attack, and some research about the human effects of the attack, was restricted during the occupation of Japan, and much of this

information was censored until the signing of the San Francisco Peace Treaty in 1951, restoring control to the Japanese.^[259]

Only the most politically charged and detailed weapons effects information was censored during this period. The Hiroshima-based magazine, *Chugoku Bunka* for example, in its first issue published March 10, 1946, devotes itself to detailing the damage from the bombing.^[260] Similarly, there was no censorship of the factually written witness accounts, the book *Hiroshima* written by Pulitzer Prize winner John Hersey, which was originally published in article form in the popular magazine *The New Yorker*,^[261] on August 31, 1946, is reported to have reached Tokyo in English by January 1947, and the translated version was released in Japan in 1949.^{[262][263][264]} The book narrates the stories of the lives of six bomb survivors from immediately prior to, and months after, the dropping of the Little Boy bomb.^[261] Beginning in 1974 a compilation of drawings and artwork made by the survivors of the bombings began to be compiled, with completion in 1977 and under both book and exhibition format, it was titled *The Unforgettable Fire*.^[265]

Post-attack casualties

In the spring of 1948, the Atomic Bomb Casualty Commission (ABCC) was established in accordance with a presidential directive from Truman to the National Academy of Sciences – National Research Council to conduct investigations of the late effects of radiation among the survivors in Hiroshima and Nagasaki.^[266] One of the early studies conducted by the ABCC was on the outcome of pregnancies occurring in Hiroshima and Nagasaki, and in a control city, Kure, located 18 mi (29 km) south of Hiroshima, in order to discern the conditions and outcomes related to radiation exposure.^[267] Dr. James V. Neel led the study which found that the number of birth defects was not significantly higher among the children of survivors who were pregnant at the time of the bombings.^[268] Neel also studied the longevity of the children who survived the bombings of Hiroshima and Nagasaki, reporting that between 90 and 95 percent were still living 50 years later.^[269]

The National Academy of Sciences questioned Neel's procedure which did not filter the Kure population for possible radiation exposure.^[270] Overall, while a statistically insignificant increase in birth defects occurred directly after the bombings of Nagasaki and Hiroshima, Neel and others noted that in approximately 50 humans who were of an early gestational age at the time of the bombing and who were all within about 1 km from the hypocenter, an increase in microencephaly and anencephaly was observed upon birth, with the incidence of these two particular malformations being nearly 3 times what was to be expected when compared to the control group in Kure.^{[271][272]}

In 1985, Johns Hopkins University human geneticist James F. Crow examined Neel's research and confirmed that the number of birth defects was not significantly higher in Hiroshima and Nagasaki.^[273] Many members of the ABCC and its successor Radiation Effects Research Foundation (RERF) were still looking for possible birth defects or other causes among the survivors decades later, but found no evidence that they were more common among the survivors.^{[269][274]}

Despite the insignificance of birth defects found in Neel's study and the detailed medical literature, up to 1987, historians such as Ronald E. Powaski frequently wrote that Hiroshima experienced "an increase in stillbirths, birth defects, and infant mortality" following the atomic bomb.^[275]

As cancers do not immediately emerge after exposure to radiation instead radiation-induced cancer has a minimum latency period of some 5+ years. An epidemiology study by the RERF estimates that from 1950 to 2000, 46% of leukemia deaths and 11% of solid cancers of unspecified lethality, could be due to radiation from the bombs, with the statistical excess being 200 leukemia deaths and 1,700 solid cancers of undeclared lethality. Both of these statistics being derived from the observation of approximately half of the total survivors, strictly those who took part in the study.^[276]

Hibakusha

The survivors of the bombings are called *hibakusha* (被爆者, Japanese pronunciation: [çibakɯɕa]), a Japanese word that literally translates to "explosion-affected people". The Japanese government has recognized about 650,000 people as *hibakusha*. As of March 31, 2017, 164,621 are still alive, mostly in Japan.^[277] The government of Japan recognizes about 1% of these as having illnesses caused by radiation.^[278] The memorials in Hiroshima and Nagasaki contain lists of the names of the *hibakusha* who are known to have died since the bombings. Updated annually on the anniversaries of the bombings, as of August 2017 the memorials record the names of almost 485,000 *hibakusha*; 308,725 in Hiroshima^[279] and 175,743 in Nagasaki.^[280]



Silent film footage taken in Hiroshima in March 1946 showing survivors with severe burns and keloid scars. Although most all survivors with burns also had burns compounded by the conventional fires that were lit after the bombing, this footage was primarily made with the survivors being asked to stand in the orientation they were in at the time of the nuclear thermal/*flash*, to document and convey the relatively unique line-of-sight nature of flash burns, and to show that, much like a sunburn, thick clothing and fabric offered complete protection in many cases. The sometimes extensive burn scar contracture that is also seen particularly around joints, is not unusual, being common to all 2nd and 3rd degree burns when they cover a large area of skin. The film also features a small number of completely unburnt survivors who were included in the film to show the recovery made by those whose hair had previously fallen out from the effects of acute radiation syndrome but by the time of filming, they had recovered.



Panoramic view of the monument marking the hypocenter, or ground zero, of the atomic bomb explosion over Nagasaki

Hibakusha and their children were (and still are) victims of severe discrimination in Japan due to public ignorance about the consequences of radiation sickness, with much of the public believing it to be hereditary or even contagious.^[281] This is despite the fact that no statistically demonstrable increase of birth defects or congenital malformations was found among

the later conceived children born to survivors of Hiroshima and Nagasaki.^[282] A study of the long-term psychological effects of the bombings on the survivors found that even 17–20 years after the bombings had occurred survivors showed a higher prevalence of anxiety and somatization symptoms.^[283]

Double survivors

On March 24, 2009, the Japanese government officially recognized Tsutomu Yamaguchi as a double *hibakusha*. He was confirmed to be 3 km (1.9 mi) from ground zero in Hiroshima on a business trip when Little Boy was detonated. He was seriously burnt on his left side and spent the night in Hiroshima. He arrived at his home city of Nagasaki on August 8, the day before Fat Man was dropped, and he was exposed to residual radiation while searching for his relatives. He was the first officially recognized survivor of both bombings.^[284] He died on January 4, 2010, at the age of 93, after a battle with stomach cancer.^[285]

The 2006 documentary *Twice Survived: The Doubly Atomic Bombed of Hiroshima and Nagasaki* documented 165 *nijū hibakusha* (*lit. double explosion-affected people*), and was screened at the United Nations.^[286]

Korean survivors

During the war, Japan brought as many as 670,000 Korean conscripts to Japan to work as forced labor.^[287] About 5,000–8,000 Koreans were killed in Hiroshima and another 1,500–2,000 died in Nagasaki.^[288] For many years, Korean survivors had a difficult time fighting for the same recognition as *Hibakusha* as afforded to all Japanese survivors, a situation which resulted in the denial of the free health benefits to them. Most issues were eventually addressed in 2008 through lawsuits.^[289]

Debate over bombings

The role of the bombings in Japan's surrender and the ethical, legal, and military controversies surrounding the United States' justification for them have been the subject of scholarly and popular debate for decades. J. Samuel Walker wrote in an April 2005 overview of recent historiography on the issue, "the controversy over the use of the bomb seems certain to continue." He wrote that "The fundamental issue that has divided scholars over a period of nearly four decades is whether the use of the bomb was necessary to achieve victory in the war in the Pacific on terms satisfactory to the United States."^[290]

Supporters of the bombings generally assert that they caused the Japanese surrender, preventing casualties on both sides during Operation Downfall. One figure of speech, "One hundred million [subjects of the Japanese Empire] will die for the Emperor and Nation",^[291] served as a unifying slogan, although that phrase was intended as a figure of speech along the lines of the "ten thousand years" phrase.^[6] In Truman's 1955 *Memoirs*, "he states that the atomic bomb probably saved half a million U.S. lives—anticipated casualties in an Allied invasion of Japan planned for November. Stimson subsequently talked of saving one million U.S. casualties, and Churchill of saving one million American and half that number of British lives."^[292] Scholars have pointed out various alternatives that could have ended the war without an invasion, but these alternatives could have resulted in the deaths of many more Japanese.^[293] Supporters also point to an order given by the Japanese War Ministry on August 1, 1944, ordering the execution of Allied prisoners of war when the POW camp was in the combat zone.^[294]



Citizens of Hiroshima walk by the Hiroshima Peace Memorial, the closest building to have survived the city's atomic bombing.

Those who oppose the bombings cite a number of reasons for their view, among them: a belief that atomic bombing is fundamentally immoral, that the bombings counted as war crimes, that they were militarily unnecessary, that they constituted state terrorism,^[295] and that they involved racism against and the dehumanization of the Japanese people.^[296] The bombings were part of an already fierce conventional bombing campaign. This, together with the naval blockade, could also have eventually led to a Japanese surrender. At the time the United States dropped its atomic bomb on Nagasaki on August 9, 1945, the Soviet Union launched a surprise attack with 1.6 million troops against the Kwantung Army in Manchuria. "The Soviet entry into the war", argued Japanese historian Tsuyoshi Hasegawa, "played a much greater role than the atomic bombs in inducing Japan to surrender because it dashed any hope that Japan could terminate the war through Moscow's mediation".^[297]

Another popular view among critics of the bombings, originating with Gar Alperovitz in 1965 and becoming the default position in Japanese school history textbooks, is the idea of atomic diplomacy: that the United States used nuclear weapons in order to intimidate the Soviet Union in the early stages of the Cold War.^[298]

Notes

1. Giangreco 2009, pp. 2–3, 49–51.
2. Williams 1960, p. 307.
3. Williams 1960, p. 532.
4. Williams 1960, p. 527.
5. Long 1963, pp. 48–49.
6. Brooks & Stanley 2007, pp. 41–44.
7. Coox 1969, pp. 2540–2544.
8. Giangreco 2009, pp. 32–34.
9. Giangreco 2009, pp. 125–130.
10. Giangreco 2009, pp. 169–171.
11. Giangreco 2009, pp. 45–48.
12. Giangreco 2009, p. 21.
13. Giangreco 2009, pp. 70–72.
14. Giangreco 2009, pp. 121–124.
15. "The Final Months of the War With Japan. Part III (note 24)" (<https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/the-final-months-of-the-war-with-japan-signals-intelligence-u-s-invasion-planning-and-the-a-bomb-decision/csi9810001.html#rtoc7>). Central Intelligence Agency. Retrieved December 17, 2013.
16. Carroll 2007, p. 48.
17. Drea 1992, pp. 202–225.
18. Giangreco 2009, pp. 98–99.
19. Frank 1999, p. 340.
20. Giangreco 2009, p. 112.
21. Schaffer 1985, pp. 164–165.
22. Craven & Cate 1953, p. 4.
23. Craven & Cate 1953, pp. 22–24.
24. Craven & Cate 1953, pp. 169–175.
25. Craven & Cate 1953, pp. 29–31.
26. Craven & Cate 1953, pp. 507–509.
27. Craven & Cate 1953, pp. 514–521.

28. Craven & Cate 1953, pp. 548–551.
29. Craven & Cate 1953, pp. 536–545.
30. Craven & Cate 1953, pp. 558–560.
31. Craven & Cate 1953, p. 566.
32. Sandler 2001, pp. 24–26.
33. Craven & Cate 1953, pp. 574–576.
34. "March 9, 1945: Burning the Heart Out of the Enemy" (<https://www.wired.com/thisdayintech/2011/03/0309incendiary-bombs-kill-100000-tokyo/>). Condé Nast. March 9, 2011. Retrieved August 8, 2011.
35. Laurence M. Vance (August 14, 2009). "Bombings Worse than Nagasaki and Hiroshima" (<https://web.archive.org/web/20121113021343/http://fff.org/comment/com0908j.asp>). The Future of Freedom Foundation. Archived from the original (<http://www.fff.org/comment/com0908j.asp>) on November 13, 2012. Retrieved August 8, 2011.
36. Joseph Coleman (March 10, 2005). "1945 Tokyo Firebombing Left Legacy of Terror, Pain" (<http://www.commondreams.org/headlines05/0310-08.htm>). CommonDreams.org. Associated Press. Retrieved August 8, 2011.
37. Craven & Cate 1953, pp. 608–610.
38. Craven & Cate 1953, pp. 568–570.
39. Edwards 1996, p. 83.
40. Werrell 1996, p. 250.
41. Craven & Cate 1953, pp. 614–617.
42. Craven & Cate 1953, pp. 642–643.
43. Kerr 1991, p. 207.
44. Yuki Tanaka and Marilyn B. Young, "Bombing Civilians: A Twentieth Century History". (New York: New Press, 2009), 5, 84–85, 117.
45. Craven & Cate 1953, pp. 653–658.
46. Coox 1994, pp. 412–414.
47. Coox 1994, p. 422.
48. Zaloga & Noon 2010, p. 54.
49. Zaloga & Noon 2010, pp. 58–59.
50. Giangreco 2009, pp. 79–80.
51. Coox 1994, p. 429.
52. Jones 1985, p. 7.
53. Jones 1985, p. 12.
54. Gowing 1964, pp. 40-43, 76-79.
55. Roosevelt, Frankin D; Churchill, Winston (August 19, 1943). "Quebec Agreement" (<http://www.atomicarchive.com/Docs/ManhattanProject/Quebec.shtml>). atomicarchive.com.
56. Edwards, Gordon. "Canada's Role in the Atomic Bomb Programs of the United States, Britain, France and India" (<http://www.ccnr.org/chronology.html>). Canadian Coalition for Nuclear Responsibility. Archived (<https://web.archive.org/web/20071213010316/http://www.ccnr.org/chronology.html>) from the original on December 13, 2007. Retrieved December 4, 2007.
57. Jones 1985, p. 89.
58. Jones 1985, pp. 82-84.
59. Jones 1985, p. 522.
60. Jones 1985, pp. 511–516.
61. Grunden 1998, pp. 50–52.
62. "Factsheets: 509th Operational Group" (<https://web.archive.org/web/20130224031059/http://www.afhra.af.mil/factsheets/factsheet.asp?id=10517>). Air Force Historical Studies Office. Archived from the original (<http://www.afhra.af.mil/factsheets/factsheet.asp?id=10517>) on February 24, 2013. Retrieved December 25, 2011.

63. "History of 509th Composite Group – 313th Bombardment Wing – Twentieth Air Force – Activation to August 15, 1945" (<https://web.archive.org/web/20120127130713/http://www.afhra.af.mil/shared/media/document/AFD-080128-037.pdf>) (PDF). Tinian: 509th CG (AFHRA archived). 1945. pp. 8–9. Archived from the original (<http://www.afhra.af.mil/shared/media/document/AFD-080128-037.pdf>) (PDF) on January 27, 2012. Retrieved February 1, 2012.
64. Tibbets 1998, pp. 163, 167–168.
65. "Minutes of 3rd Target Committee Meeting 28 May 1945" (<http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB162/9.pdf>) (PDF). National Archives. Archived (<https://web.archive.org/web/20060809093247/http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB162/9.pdf>) (PDF) from the original on August 9, 2006. Retrieved August 9, 2006.
66. Campbell 2005, p. 25.
67. Craven & Cate 1953, p. 706.
68. Campbell 2005, pp. 14–15.
69. "History of 509th Composite Group – 313th Bombardment Wing – Twentieth Air Force – Activation to 15 August 1945" (<https://web.archive.org/web/20120127130713/http://www.afhra.af.mil/shared/media/document/AFD-080128-037.pdf>) (PDF). Tinian: Air Force Historical Research Agency. 1945. pp. 17–22. Archived from the original (<http://www.afhra.af.mil/shared/media/document/AFD-080128-037.pdf>) (PDF) on January 27, 2012. Retrieved February 1, 2012.
70. Campbell 2005, p. 100.
71. Christman 1998, p. 176.
72. Jones 1985, pp. 528–529.
73. "Atomic Bomb: Decision—Target Committee, May 10–11, 1945" (<http://www.dannen.com/decision/targets.html>). Archived (<https://web.archive.org/web/20050808014201/http://www.dannen.com/decision/targets.html>) from the original on August 8, 2005. Retrieved August 6, 2005.
74. Reischauer 1986, p. 101.
75. Kelly, Jason M. (2012). "Why Did Henry Stimson Spare Kyoto from the Bomb?: Confusion in Postwar Historiography" (<http://booksandjournals.brillonline.com/content/10.1163/18765610-01902004>). *Journal of American-East Asian Relations*. **19** (2): 183–203. doi:10.1163/18765610-01902004 (<https://doi.org/10.1163%2F18765610-01902004>).
76. Jones 1985, p. 529.
77. Hasegawa 2006, pp. 67–68.
78. Hasegawa 2006, pp. 149–150.
79. Jones 1985, p. 530.
80. Frank 1999, pp. 255–256.
81. Compton 1956, p. 240.
82. Compton 1956, pp. 238–239.
83. Frank 1999, pp. 255–260.
84. Newman 1995, p. 86.
85. "The Atomic Bomb and the End of World War II, A Collection of Primary Sources" (<http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB162/72.pdf>) (PDF). *National Security Archive Electronic Briefing Book No. 162*. George Washington University. August 13, 1945.
86. Williams, Josette H. "The Information War in the Pacific, 1945 Paths to Peace" (<https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/csi-studies/studies/vol46no3/article07.html>). Central Intelligence Agency. Retrieved December 5, 2016.)
87. Craven & Cate 1953, p. 656.
88. Frank 1999, p. 153.
89. McNelly 2000, p. 138.
90. Lifton 1991, p. 17.
91. 空襲予告ビラ、高山市民が保管 市内で展示 (https://web.archive.org/web/20131012064011/http://www.gifu-np.co.jp/kikaku/2008/gifu63/g63_20080804.shtml) [Air Raid Notice] (in Japanese). 岐阜新聞社 (Gifu Shinbunsha (Open Library)). Archived from the original (http://www.gifu-np.co.jp/kikaku/2008/gifu63/g63_20080804.shtml) on 2013-10-12. Retrieved January 31, 2013.

92. Bungei 1981, p. 215.
93. Bradley 1999, p. 103.
94. Miller 1986, p. 43.
95. Hewlett & Anderson 1962, pp. 372–373.
96. Gowing 1964, p. 372.
97. "Minutes of a Meeting of the Combined Policy Committee," (<https://history.state.gov/historicaldocuments/frus1945Berlinv01/d619>). Washington, DC: United States Department of State. July 4, 1945. Retrieved 18 September 2017.
98. Craven & Cate 1953, pp. 712–713.
99. "Pages from President Truman's diary, July 17, 18, and 25, 1945" (http://www.trumanlibrary.org/whistlestop/study_collections/bomb/large/documents/fulltext.php?fulltextid=15). Harry S. Truman Library & Museum. Retrieved December 16, 2013.
100. Hewlett & Anderson 1962, pp. 389–390.
101. Hewlett & Anderson 1962, pp. 395–396.
102. Frank 1999, pp. 233–234. The meaning of *mokusatsu* can fall anywhere in the range of "ignore" to "treat with contempt".
103. Bix 1996, p. 290.
104. Asada 1996, p. 39.
105. Thomas & Morgan-Witts 1977, pp. 326, 356, 370.
106. Hoddeson et al. 1993, p. 262.
107. Hoddeson et al. 1993, p. 265.
108. Coster-Mullen 2012, p. 30.
109. Coster-Mullen 2012, p. 45.
110. Campbell 2005, pp. 38–40.
111. Giangreco 2009, pp. 64–65, 163.
112. Goldstein, Dillon & Wenger 1995, p. 41.
113. Giangreco 2009, pp. 70, 163.
114. Zaloga & Noon 2010, p. 59.
115. United States Strategic Bombing Survey (June 1946). "U. S. Strategic Bombing Survey: The Effects of the Atomic Bombings of Hiroshima and Nagasaki" (<https://web.archive.org/web/2004101111052/http://www.nuclearfiles.org/redocuments/1946/460619-bombing-survey1.html>). nuclearfiles.org. Archived from the original (<http://www.nuclearfiles.org/redocuments/1946/460619-bombing-survey1.html>) on October 11, 2004. Retrieved July 26, 2009.
116. Thomas & Morgan-Witts 1977, pp. 224–225.
117. Groves 1962, p. 316.
118. Frank 1999, p. 263.
119. Thomas & Morgan-Witts 1977, p. 38.
120. "Frequently Asked Questions #1" (http://www.rerf.or.jp/general/qa_e/qa1.html). Radiation Effects Research Foundation. Archived (https://web.archive.org/web/20070919143939/http://www.rerf.or.jp/general/qa_e/qa1.html) from the original on September 19, 2007. Retrieved September 18, 2007.
121. Bodden 2007, p. 20.
122. Preston 2005, p. 262.
123. Fiévé & Waley 2003, p. 330.
124. Rotter 2008, p. 267.
125. Rosen, Rebecca J. (January 11, 2013). "Rare Photo of the Mushroom Cloud Over Hiroshima Discovered in a Former Japanese Elementary School" (<https://www.theatlantic.com/technology/archive/2013/01/rare-photo-of-the-mushroom-cloud-over-hiroshima-discovered-in-a-former-japanese-elementary-school/267042/>). *The Atlantic*. Retrieved December 4, 2016.

126. "509th Timeline: Inception to Hiroshima" (http://www.mphpa.org/classic/CG/CG_09C.htm). The Atomic Heritage Foundation. Retrieved May 5, 2007.
127. "Timeline #2 – the 509th; The Hiroshima Mission" (<http://www.mphpa.org/classic/HISTORY/H-07L.htm>). The Atomic Heritage Foundation. Retrieved May 4, 2007.
128. Dietz & Van Kirk 2012, p. 462.
129. Dietz & Van Kirk 2012, p. 467.
130. Lewis & Tolzer 1957, p. 72.
131. "Timeline #2- the 509th; The Hiroshima Mission" (<http://www.mphpa.org/classic/HISTORY/H-07L1.htm>). The Atomic Heritage Foundation. Retrieved May 5, 2007.
132. Thomas & Morgan-Witts 1977, pp. 391–392.
133. Thomas & Morgan-Witts 1977, p. 414.
134. Thomas & Morgan-Witts 1977, p. 415.
135. Allen 1969, p. 2566.
136. Kerr et al 2005, pp. 42–43.
137. Malik, John (September 1985). "The Yields of the Hiroshima and Nagasaki Explosions" (<http://www.osti.gov/manhattan-project-history/publications/LANLHiroshimaNagasakiYields.pdf>) (PDF). Los Alamos National Laboratory. Retrieved March 9, 2014. describes how various values were recorded for the B-29's altitude at the moment of bomb release over Hiroshima. The strike report said 30,200 ft, the official history said 31,600 ft, Commander Parson's log entry was 32,700 ft, and the navigator's log was 31,060 ft—the latter possibly an error transposing two digits. A later calculation using the indicated atmospheric pressure arrived at the figure of 32,200 ft. Similarly, several values have been reported as the altitude of the Little Boy bomb at the moment of detonation. Published sources vary in the range of 1,800 to 2,000 ft (550 to 610 m) above the city. The device was set to explode at 1,885 ft (575 m), but this was approximate. Malik uses the figure of 1,903 ft (580 m) plus or minus 50 ft (15 m), determined after data review by Hubbell et al 1969. Radar returns from the tops of multistory buildings near the hypocenter may have triggered the detonation at a somewhat higher altitude than planned. Kerr et al. (2005) found that a detonation altitude of 600 m (1,968.5 ft), plus or minus 20 m (65.6 ft), gave the best fit for all the measurement discrepancies.
138. "The Atomic Bombing of Hiroshima, Aug 6, 1945" (<https://web.archive.org/web/20100624065430/http://www.cfo.doe.gov/me70/manhattan/hiroshima.htm>). United States Department of Energy. Archived from the original (<http://www.cfo.doe.gov/me70/manhattan/hiroshima.htm>) on June 24, 2010. Retrieved June 25, 2010.
139. "A Photo-Essay on the Bombing of Hiroshima and Nagasaki" (http://www.english.illinois.edu/maps/poets/g_l/levine/bombing.htm). University of Illinois at Urbana-Champaign. Retrieved December 4, 2016.
140. Broad, William J. (May 23, 2016). "The Hiroshima Mushroom Cloud That Wasn't" (https://www.nytimes.com/2016/05/24/science/hiroshima-atomic-bomb-mushroom-cloud.html?_r=0). *The New York Times*. Retrieved December 4, 2016.
141. "Atmospheric effects and societal consequences of regional scale nuclear conflicts and acts of individual nuclear terrorism" (<http://climate.envsci.rutgers.edu/pdf/acp-7-1973-2007.pdf>) (PDF). p. 1994. Retrieved December 4, 2016.
142. "Atmospheric Processes : Chapter=4" (http://globalecology.stanford.edu/SCOPE/SCOPE_28_1/SCOPE_28-1_1.4_Chapter4_105-147.pdf) (PDF). Stanford University. Retrieved May 11, 2016.
143. Robock, Alan; Luke Oman; Georgiy L. Stenchikov; Owen B. Toon; Charles Bardeen & Richard P. Turco (2007). "Climatic consequences of regional nuclear conflicts" (<http://climate.envsci.rutgers.edu/pdf/acp-7-2003-2007.pdf>) (PDF). *Atmos. Chem. Phys.* **7** (8): 2003–12. doi:10.5194/acp-7-2003-2007 (<https://doi.org/10.5194%2FACP-7-2003-2007>).
144. Thomas & Morgan-Witts 1977, pp. 423. 427.
145. "The Bomb-"Little Boy"" (http://www.mphpa.org/classic/HISTORY/little_boy.htm). The Atomic Heritage Foundation. Retrieved May 5, 2007.
146. "Radiation Dose Reconstruction U.S. Occupation Forces in Hiroshima and Nagasaki, Japan, 1945–1946 (DNA 5512F)" (https://web.archive.org/web/20060624185903/http://www.dtra.mil/toolbox/directorates/td/programs/nuclear_personnel/docs/DNATR805512F.pdf) (PDF). Archived from the original (http://www.dtra.mil/toolbox/directorates/td/programs/nuclear_personnel/docs/DNATR805512F.pdf) (PDF) on June 24, 2006. Retrieved June 9, 2006.

147. Frank 1999, pp. 264–265.
148. "Hiroshima and Nagasaki Bombing – Facts about the Atomic Bomb" (http://www.hiroshimacommittee.org/Facts_NagasakiAndHiroshimaBombing.htm). Hiroshimacommittee.org. Retrieved August 11, 2013.
149. "U. S. Strategic Bombing Survey: The Effects of the Atomic Bombings of Hiroshima and Nagasaki, June 19, 1946. President's Secretary's File, Truman Papers" (http://www.trumanlibrary.org/whistlestop/study_collections/bomb/large/documents/index.php?pagenumber=11&documentid=65&documentdate=1946-06-19). Harry S. Truman Presidential Library and Museum. p. 6. Retrieved January 23, 2016.
150. "U. S. Strategic Bombing Survey: The Effects of the Atomic Bombings of Hiroshima and Nagasaki, June 19, 1946. President's Secretary's File, Truman Papers" (http://www.trumanlibrary.org/whistlestop/study_collections/bomb/large/documents/index.php?pagenumber=42&documentid=65&documentdate=1946-06-19). Harry S. Truman Presidential Library and Museum. p. 37. Retrieved January 23, 2016.
151. Frank 1999, p. 286–87.
152. "Super-fortress crew tell their story" (<https://www.theguardian.com/century/1940-1949/Story/0,,127716,00.html>). *The Guardian*. August 8, 1945. Retrieved July 17, 2016.
153. "Statements by China and the United States of America during the Inscription of the Hiroshima Peace Memorial (Genbaku Dome)" (<http://whc.unesco.org/archive/repc096x.htm#annex5>). UNESCO. Archived (<https://web.archive.org/web/20050829222745/http://whc.unesco.org/archive/repc096x.htm>) from the original on August 29, 2005. Retrieved August 6, 2005.
154. "U.S. Strategic Bombing Survey: The Effects of the Atomic Bombings of Hiroshima and Nagasaki, June 19, 1946. President's Secretary's File, Truman Papers" (http://www.trumanlibrary.org/whistlestop/study_collections/bomb/large/documents/index.php?pagenumber=14&documentid=65&documentdate=1946-06-19). Harry S. Truman Library & Museum. p. 9. Retrieved January 23, 2016.
155. Ham 2011, p. 330.
156. "Special Exhibit 3" (http://www.pcf.city.hiroshima.jp/virtual/VirtualMuseum_e/exhibit_e/exh0203_e/exh02033_e.html). Hiroshima Peace Memorial Museum. Retrieved August 30, 2010.
157. Kato, Toru (June 4, 1999). "A Short-Sighted Parrot" (<http://www.geocities.jp/cato1963/kinganE.html>). Geocities.jp. Archived (<https://web.archive.org/web/20090309160606/http://www.geocities.jp/cato1963/kinganE.html>) from the original on March 9, 2009. Retrieved March 25, 2009.
158. "'Hiroshima – 1945 & 2007" by Lyle (Hiroshi) Saxon, Images Through Glass, Tokyo" (<http://www5d.biglobe.ne.jp/~LLLtrs/PhotoGlryMain/pgc/Hiroshima01a.html>). NEC Biglobe. August 6, 1945. Retrieved April 21, 2013.
159. "Hiroshima: A Visual Record" (http://www.japanfocus.org/-elin_o_Hara-slavick/3196). JapanFocus. Retrieved April 21, 2013.
160. "Testimony of Akiko Takakura" (<http://www.inicom.com/hibakusha/akiko.html>). Atomic Archive. Archived (<https://web.archive.org/web/20070416134051/http://www.inicom.com/hibakusha/akiko.html>) from the original on April 16, 2007. Retrieved April 30, 2007.
161. "U. S. Strategic Bombing Survey: The Effects of the Atomic Bombings of Hiroshima and Nagasaki, June 19, 1946. President's Secretary's File, Truman Papers" (http://www.trumanlibrary.org/whistlestop/study_collections/bomb/large/documents/index.php?pagenumber=12&documentid=65&documentdate=1946-06-19). Harry S. Truman Presidential Library and Museum. p. 7. Retrieved January 23, 2016.
162. Ham 2011, pp. 330–331.
163. Ham 2011, p. 325.
164. "Memories of Hiroshima and Nagasaki" (<http://www.asahi.com/hibakusha/english/shimen/happened/happened-01.html>). The Asahi Shimbun. Retrieved March 18, 2014.
165. Thomas & Morgan-Witts 1977, pp. 443–444.
166. "Heart of Hiroshima Wiped Out as by Giant Bulldozer" (<http://nla.gov.au/nla.news-article68935692>). *Advocate (Burnie, Tas. : 1890–1954)*. Burnie, Tasmania: National Library of Australia. August 9, 1945. p. 1. Retrieved September 17, 2013.
167. Thomas & Morgan-Witts 1977, pp. 443–444.
168. Ham 2011, p. 333.

169. "Americans Killed by Atomic Bomb to be Honored in Hiroshima" (<http://www.allgov.com/news/us-and-the-world/americans-killed-by-atomic-bomb-to-be-honored-in-hiroshima?news=838959>). *Allgov.com*. June 4, 2009. Retrieved December 28, 2012.
170. Thomas & Morgan-Witts 1977, pp. 444–445.
171. Mitchell, Greg (August 5, 2011). "Hidden History: American POWs Were Killed in Hiroshima" (<https://www.thenation.com/article/hidden-history-american-pows-were-killed-hiroshima/>). *The Nation*. Retrieved February 24, 2017.
172. "Sheryl P. Walter Declassified/Released US Department of State EO Systematic Review 20 Mar 2014 Sheryl P. Walter Declassified/Released US Department of State EO Systematic Review 20 Mar 2014" (<https://aad.archives.gov/aad/createpdf?rid=185912&dt=2694&dl=2009>). National Archives and Records Administration. Retrieved December 5, 2016.
173. Knebel & Bailey 1960, pp. 175–201
174. "The Atomic Bombings of Hiroshima and Nagasaki" (http://www.abomb1.org/hiroshim/hiro_med.html). The Manhattan Engineer District. June 29, 1946. Retrieved January 10, 2013.
175. "Statement by the President Announcing the Use of the A-Bomb at Hiroshima" (<http://www.trumanlibrary.org/publicpapers/index.php?pid=100>). Harry S. Truman Presidential Library and Museum. August 6, 1945. Retrieved April 2, 2015.
176. United States Department of State (1945). "Foreign Relations of the United States: diplomatic papers: the Conference of Berlin (the Potsdam Conference)" (<http://digital.library.wisc.edu/1711.dl/FRUS.FRUS1945Berlinv02>). Foreign Relations of the United States. 2. U.S. Government Printing Office: 1376–1377.
177. "OWI Pacific Psyop Six Decades ago" (<http://www.psywarrior.com/OWI60YrsLater2.html>). Herbert A. Friedman.
178. "Nagasaki Atomic Bomb Museum" (https://web.archive.org/web/20140310183742/http://www.city.nagasaki.lg.jp/peace/english/abm/download/leaflet_e.pdf) (PDF). Archived from the original (http://www.city.nagasaki.lg.jp/peace/english/abm/download/leaflet_e.pdf) (PDF) on March 10, 2014.
179. "Atomic Bombing of Hiroshima" (<http://www.century-of-flight.net/Aviation%20history/WW2/Atomic%20Bombing%20of%20Hiroshima.htm>). A century of flight. Retrieved December 5, 2016.
180. "Warning Leaflets" (<http://www.atomicheritage.org/key-documents/warning-leaflets>). Atomic heritage foundation. Retrieved December 5, 2016.
181. Scoenberger, Walter (1969). *Decision of Destiny*. Columbus: Ohio University Press. pp. 248–249.
182. Bix 1996, p. 512.
183. Slavinskii 2004, pp. 153–154.
184. Frank 1999, pp. 288–289.
185. Hoyt 2001, p. 401.
186. Frank 1999, pp. 283–284.
187. Russ 1990, pp. 64–65.
188. Groves 1962, p. 342.
189. "U.S. Strategic Bombing Survey: The Effects of the Atomic Bombings of Hiroshima and Nagasaki, June 19, 1946. President's Secretary's File, Truman Papers" (http://www.trumanlibrary.org/whistlestop/study_collections/bomb/large/documents/index.php?pagenumber=15&documentid=65&documentdate=June%2019,%201946&studycollectionid=abomb). Harry S. Truman Library & Museum. p. 15. Retrieved December 21, 2012.
190. Groves 1962, p. 309.
191. Johnston, Robert. "Nagasaki atomic bombing, 1945" (<http://www.johnstonsarchive.net/nuclear/radevents/1945JAP2.html>). Retrieved February 26, 2013.
192. Thomas & Morgan-Witts 1977, pp. 353–354.
193. Sherwin 2003, pp. 233–23.
194. Campbell 2005, p. 114.
195. Campbell 2005, p. 32.
196. "Timeline #3- the 509th; The Nagasaki Mission" (<http://www.mphpa.org/classic/HISTORY/H-07m1.htm>). The Atomic Heritage Foundation. Retrieved May 5, 2007.
197. Sweeney, Antonucci & Antonucci 1997, pp. 204–205.

198. "The Story of Nagasaki" (<http://www.hiroshima-remembered.com/history/nagasaki/page3.html>). Retrieved March 29, 2013.
199. Sweeney, Antonucci & Antonucci 1997, p. 212.
200. Sweeney, Antonucci & Antonucci 1997, p. 211.
201. "Steel mill worker reveals blocking view of U.S. aircraft on day of Nagasaki atomic bombing" (<https://web.archive.org/web/20151122171430/http://mainichi.jp/english/english/features/news/20140726p2a00m0na014000c.html>). Mainichi Weekly. Archived from the original (<http://mainichi.jp/english/english/features/news/20140726p2a00m0na014000c.html>) on 2015-11-22. Retrieved January 23, 2016.
202. Sweeney, Antonucci & Antonucci 1997, pp. 213–215.
203. "Spitzer Personal Diary Page 25 (CGP-ASPI-025)" (<http://www.mphpa.org/classic/COLLECTIONS/CG-ASPI/01/Pages/CGP-ASPI-025.htm>). The Atomic Heritage Foundation. Retrieved May 5, 2007.
204. Sweeney, Antonucci & Antonucci 1997, pp. 216–217.
205. Chun 2008, p. 70.
206. Hoddeson et al. 1993, p. 295.
207. "Stories from Riken" (<http://www.riken.jp/r-world/info/release/riken88/text/image/pdf/no09e.pdf>) (PDF). Retrieved April 30, 2007.
208. Kerr et al 2005, pp. 43, 46.
209. Wainstock 1996, p. 92.
210. "*The Atomic Bomb*" (https://www.pbs.org/thewar/detail_5234.htm). Pbs.org. Retrieved November 4, 2010.
211. Delgado 2009, p. 107.
212. Groves 1962, p. 346.
213. Sweeney, Antonucci & Antonucci 1997, pp. 222–226.
214. Laurence, William L. "Eyewitness Account of Atomic Bomb Over Nagasaki" (<http://www.atomicarchive.com/Docs/Hiroshima/Nagasaki.shtml>). National Science Digital Library. Retrieved March 28, 2013.
215. Campbell 2005, p. 222.
216. Campbell 2005, p. 184.
217. Ham 2011, p. 367.
218. Sklar 1984, pp. 56–60.
219. "The Atomic Bombings of Hiroshima and Nagasaki" (http://www.atomicarchive.com/Docs/MED/med_chp10.shtml). Atomic Archive. Retrieved August 16, 2016.
220. Sodei 1998, p. ix.
221. Rezelman, David; F.G. Gosling; Terrence R. Fehner (2000). "The atomic bombing of Nagasaki" (<https://web.archive.org/web/20070830023025/http://www.cfo.doe.gov/me70/manhattan/nagasaki.htm>). *The Manhattan Project: An Interactive History*. U.S. Department of Energy. Archived from the original (<http://www.cfo.doe.gov/me70/manhattan/nagasaki.htm>) on August 30, 2007. Retrieved September 18, 2007.
222. "Hiroshima, Nagasaki, and Subsequent Weapons Testing" (<http://www.world-nuclear.org/info/Safety-and-Security/Radiation-and-Health/Hiroshima,-Nagasaki,-and-Subsequent-Weapons-Testing/>). World Nuclear Association. May 2010. Retrieved July 10, 2014.
223. Alperovitz & Tree 1996, p. 534.
224. "Nagasaki memorial adds British POW as A-bomb victim" (<http://www.japantimes.co.jp/news/2005/06/25/national/nagasaki-memorial-adds-british-pow-as-a-bomb-victim/#.Ulhj4j-bHyl>). *The Japan Times*. June 25, 2005. Retrieved January 9, 2009.
225. "Two Dutch POWs join Nagasaki bomb victim list" (<https://web.archive.org/web/20051220095835/http://search.japantimes.co.jp/print/news/nn08-2005/nn20050805a7.htm>). *The Japan Times*. August 5, 2005. Archived from the original (<http://search.japantimes.co.jp/print/news/nn08-2005/nn20050805a7.htm>) on December 20, 2005. Retrieved January 9, 2009.
226. "How Effective Was Navajo Code? One Former Captive Knows" (<http://www.thepeoplespaths.net/articles/navcode.htm>). *News from Indian Country*. August 1997. Retrieved September 15, 2013.

227. "POW's Remarkable Escapes in Nagasaki" (<http://nla.gov.au/nla.news-article972178>). *The Argus*. Melbourne: National Library of Australia. September 19, 1945. p. 20. Retrieved February 22, 2014.
228. "Nagasaki marks tragic anniversary" (http://english.people.com.cn/200508/10/eng20050810_201424.html). *People's Daily*. August 10, 2005. Retrieved April 14, 2007.
229. "U.S. Strategic Bombing Survey: The Effects of the Atomic Bombings of Hiroshima and Nagasaki, June 19, 1946. President's Secretary's File, Truman Papers" (http://www.trumanlibrary.org/whistlestop/study_collections/bomb/large/documents/index.php?pagenumber=19&documentid=65&documentdate=June%2019,%201946). Harry S. Truman Library & Museum. p. 19. Retrieved January 23, 2016.
230. Glasstone & Dolan 1977, p. 304.
231. "Photos of Hiroshima and Nagasaki after the bombing, from a 1946 US report" (<http://www.nationalarchives.gov.uk/education/heroesvillains/g5/cs3/g5cs3s2d.htm>). Retrieved December 3, 2016.
232. Bernstein, Barton J. (Spring 1991). "Eclipsed by Hiroshima and Nagasaki: Early Thinking about Tactical Nuclear Weapons". *International Security*. **15** (4): 149–173. doi:10.2307/2539014 (<https://doi.org/10.2307%2F2539014>). ISSN 0162-2889 (<https://www.worldcat.org/issn/0162-2889>). JSTOR 2539014 (<https://www.jstor.org/stable/2539014>).
233. Hoddeson et al. 1993, pp. 396–397.
234. Terkel, Studs (November 1, 2007). "Paul Tibbets Interview" (http://www.avweb.com/news/profiles/PaulTibbets_StudsTerkel_EnolaGayInterview_2002_196499-1.html). Aviation Publishing Group. Retrieved January 2, 2012.
235. "Lawrence Litz's Interview (2012)" (<http://manhattanprojectvoices.org/oral-histories/lawrence-litzs-interview-2012>). Manhattan Project Voices. Retrieved February 27, 2015.
236. Wellerstein, Alex (August 16, 2013). "The Third Core's Revenge" (<http://blog.nuclearsecrecy.com/2013/08/16/the-third-cores-revenge/>). Restricted Data. Retrieved January 27, 2015.
237. Kido & Yoshitake 1966, p. 1223.
238. Fujiwara 1991, p. 129.
239. Frank 1999, pp. 316–319.
240. "Imperial Rescript ending war – What Hirohito really said in his acceptance speech" (https://archive.is/20130915082323/http://members.jcom.home.ne.jp/yosha/yr/empires/Imperial_rescript_1945-08-14.html). translated by William Wetherall. Yosha Research. Archived from the original (http://members.jcom.home.ne.jp/yosha/yr/empires/Imperial_rescript_1945-08-14.html) on September 15, 2013. Retrieved September 15, 2013.
241. "Emperor Hirohito's Surrender Rescript to Japanese Troops" (<https://www.webcitation.org/64zoOO3CN?url=http://www.taiwandocuments.org/surrender07.htm>). Taiwan Document Project. Archived from the original (<http://www.taiwandocuments.org/surrender07.htm>) on January 27, 2012. Retrieved September 15, 2013.
242. Harvey 2007, pp. 234–240.
243. Dower, John (2012) *Ways of Forgetting, Ways of Remembering: Japan in the Modern World* (<https://books.google.com/books?id=LHUIr8vh7x4C&pg=PA36&dq=Japanese+%22nameless+mass+of+vermin%22&hl=en&sa=X&ved=0ahUKewitpZDfqYrVAhUCwFQKHcuCDpkQ6AEIOzAE#v=onepage&q=Japanese%20%22nameless%20mass%20of%20vermin%22&f=false>). p. 36.
244. Weingartner, James J. (February 1992). "Trophies of War: U.S. Troops and the Mutilation of Japanese War Dead, 1941-1945" (<https://docs.google.com/fileview?id=0B-5-JeCa2Z7hN2ZkMWRiNmYtN2M4Ny00YjQ2LWJIMjYtZGY0NmMxMzM5NzQ2&hl=en>). *Pacific Historical Review*. **61** (1): 53–67. JSTOR 3640788 (<https://www.jstor.org/stable/3640788>). Archived (https://www.webcitation.org/60qayJ6nA?url=https://doc-0s-1o-docs.googleusercontent.com/docs/securesc/ha0ro937gcuc717deffksulhg5h7mbp1/ii7d704je452pc3b184aifn0nft8ub2e/1313028000000/16875855194702050732*/0B-5-JeCa2Z7hN2ZkMWRiNmYtN2M4Ny00YjQ2LWJIMjYtZGY0NmMxMzM5NzQ2?e=download) from the original on August 11, 2011. "Pictorially, Japanese were commonly represented as apes or monkeys, but also as insects, reptiles, and bats."
245. Bagby 1999, p. 135.
246. Feraru 1950, p. 101.
247. Monk 2012, p. 450.

248. "Transcript of Surreptitiously Taped Conversations among German Nuclear Physicists at Farm Hall (August 6-7, 1945)" (<http://germanhistorydocs.ghi-dc.org/pdf/eng/English101.pdf>) (PDF). German History in Documents and Images. Retrieved 24 September 2016.
249. "Vatican Regrets Inventors Did Not Destroy Bomb" (<https://news.google.com/newspapers?id=9EMyAAAAIBAJ&sjid=8OcFAAAAIBAJ&pg=1891%2C1435285>). *The Miami News*. Associated Press. August 7, 1945. pp. 1–A. Retrieved August 22, 2013.
250. "No abbey service" (<https://www.theguardian.com/century/1940-1949/Story/0,,127725,00.html>). *The Guardian*. 1945-08-15. Retrieved 17 July 2016.
251. Hixson 2002, p. 239.
252. White 1995, pp. 1–8.
253. Hein & Selden 1997, pp. 25–26.
254. "The Bombing of Nagasaki After Yosuke Yamahata: A collection of 24 photographs taken the day after the bombing, [Japan] 1945-46" (<https://www.bonhams.com/auctions/21651/lot/348/>). Bonhams. Retrieved December 5, 2016.
255. Burchett 2004, pp. 10–25.
256. Goodman, Amy; Goodman, David (August 5, 2005). "The Hiroshima Cover-Up" (http://articles.baltimoresun.com/2005-08-05/news/0508050019_1_atomic-bombings-bomb-on-hiroshima-george-weller). *The Baltimore Sun*. Retrieved September 15, 2013.
257. Greg Mitchell (August 7, 2009). "The Great Hiroshima Cover-Up" (http://www.huffingtonpost.com/greg-mitchell/for-64th-anniversary-the_b_252752.html). *Huffington Post*. Retrieved April 26, 2011.
258. Moore 1995, p. 73.
259. Ishikawa & Swain 1981, p. 5.
260. "Destructive Effects" (http://www.atomicbombmuseum.org/3_social.shtml). Atomic Bomb Museum. Retrieved 22 December 2016.
261. Angell, Roger (July 31, 1995). "Hersey and History". *The New Yorker*. From the Archives. p. 66.
262. Richie, Donald (August 16, 2013). "The pure horror of Hiroshima" (<http://www.japantimes.co.jp/culture/2009/08/16/books/the-pure-horror-of-hiroshima/#.UdhVsfnVDTc>). *The Japan Times*. Retrieved October 12, 2013.
263. Sharp 2000, pp. 434–452.
264. Michaub, Jon (June 8, 2010). "Eighty-Five from the Archive: John Hersey" (<http://www.newyorker.com/online/blogs/backissues/2010/06/eighty-five-from-the-archive-john-hersey.html>). *The New Yorker*. Retrieved February 3, 2014.
265. Japanese Broadcasting Corporation (NHK) (1977). *Unforgettable Fire: Pictures Drawn by Atomic Bomb Survivors* (<https://archive.org/details/UnforgettableFireDrawingsByAtomicBombSurvivors1967>). New York: Pantheon Books. ISBN 978-0394748238.
266. Putnam, Frank W. "The Atomic Bomb Casualty Commission in Retrospect" (<http://www.pnas.org/content/95/10/5426.full>). National Academy of Sciences. Retrieved January 31, 2014.
267. "The Radiation Effects Research Foundation Website" (http://www.rerf.or.jp/index_e.html). Rerf.or.jp. Archived (https://web.archive.org/web/20090308004959/http://rerf.or.jp/index_e.html) from the original on March 8, 2009. Retrieved March 25, 2009.
268. Voosen, Paul (April 11, 2011). "Nuclear Crisis: Hiroshima and Nagasaki cast long shadows over radiation science" (<http://www.eenews.net/stories/1059947655>). E&E News. Retrieved December 22, 2013.
269. "The American Spectator, Volume 35". *Saturday Evening Club*. 2002. p. 57.
270. Johnston 2008, p. 143.
271. McCormack 2008, p. 56.
272. "Birth defects among the children of atomic-bomb survivors (1948–1954)" (http://www.rerf.jp/radefx/genetics_e/birthdef.html). Radiation Effects Research Foundation. Retrieved December 22, 2013.
273. Krimsky & Shorett 2005, p. 118.
274. "Data India". *Press Institute of India*. 2008. p. 697.
275. Powaski 1987, p. 27.

276. "Frequently Asked Questions #2" (http://www.rerf.or.jp/general/qa_e/qa2.html). *Radiation Effects Research Foundation*. Retrieved March 2, 2014.
277. "Hiroshima marks 72nd A-bomb anniversary with eyes on ban treaty" (<https://mainichi.jp/english/articles/20170806/p2g/00m/0dm/026000c>). *The Mainichi*. August 6, 2017. Retrieved 2017-08-09.
278. "Relief for A-bomb victims" (<http://www.japantimes.co.jp/opinion/2007/08/15/editorials/relief-for-a-bomb-victims/>). *The Japan Times*. August 15, 2007. Retrieved October 2, 2007.
279. "UN chief calls for intensified effort on nuclear disarmament" (<http://asiannewsservice.in/en/international/11533/>). Asian News Service. August 7, 2017. Retrieved 2017-08-09.
280. "Atomic bombing of Nagasaki remembered" (<http://the-japan-news.com/news/article/0003871297>). *The Japan News*. August 9, 2017. Retrieved 2017-08-09.
281. "Prejudice haunts atomic bomb survivors" (<https://web.archive.org/web/20070810060050/http://www.nci.org/0new/hibakusha-jt5701.htm>). *Japan Times*. Archived from the original (<http://www.nci.org/0new/hibakusha-jt5701.htm>) on August 10, 2007. Retrieved August 25, 2007.
282. "Birth defects among the children of atomic-bomb survivors (1948–1954)" (http://www.rerf.jp/radefx/genetics_e/birthdef.html). Radiation Effects Research Foundation (RERF). Formerly known as the Atomic Bomb Casualty Commission (ABCC). Retrieved February 2, 2014.
283. Michiko Yamada; Shizue Izumi (2002). "Psychiatric sequelae in atomic bomb survivors in Hiroshima and Nagasaki two decades after the explosions" (<https://link.springer.com/article/10.1007%2Fs00127-002-0572-5>). *Social Psychiatry and Psychiatric Epidemiology*. Springer. **37** (9): 409–415. doi:10.1007/s00127-002-0572-5 (<https://doi.org/10.1007%2Fs00127-002-0572-5>). Retrieved March 7, 2014.
284. "Japan Confirms First Double A-Bomb Survivor" (<http://news.sky.com/story/679401/japan-confirms-first-double-a-bomb-survivor>). *News.sky.com*. Retrieved November 4, 2010.
285. "Man who survived two atom bombs dies" (<http://www.cnn.com/2010/WORLD/asiapcf/01/06/japan.bomb.victim.dies/index.html>). *CNN*. January 8, 2010. Archived (<https://web.archive.org/web/20100107042406/http://www.cnn.com/2010/WORLD/asiapcf/01/06/japan.bomb.victim.dies/index.html>) from the original on January 7, 2010. Retrieved January 8, 2010.
286. "Twice Bombed, Twice Survived: Film Explores Untold Stories from Hiroshima & Nagasaki" (<http://www.columbia.edu/cu/news/06/08/twicesurvived.html>). Columbia University. August 2, 2006. Archived (<https://web.archive.org/web/20090403051426/http://www.columbia.edu/cu/news/06/08/twicesurvived.html>) from the original on April 3, 2009. Retrieved March 31, 2009.
287. Gruhl 2007, p. 111.
288. Dower, John W. (March 29, 1996). "The Bombed". In Michael J. Hogan. *Hiroshima in History and Memory* (<https://books.google.com/books?id=ptgudYEFOM0C&pg=PA140>). Cambridge University Press. p. 140. ISBN 9780521566827. Dower says that Korean survivor groups use higher estimates.
289. Palmer, David (February 20, 2008). "Korean Hibakusha, Japan's Supreme Court and the International Community: Can the U.S. and Japan Confront Forced Labor and Atomic Bombing?" (<http://japanfocus.org/-David-Palmer/2670>). *Asia-Pacific Journal*. Retrieved January 3, 2012.
290. Walker 2005, p. 334.
291. Jowett & Andrew 2002, pp. 23–24.
292. Selden & Selden 1990, pp. xxx–xxxi.
293. Walker 1990, pp. 97–114.
294. s:Kill All Prisoners Order (Introduced into the Tokyo War Crimes Trials in January 1947 as Document No. 2701 (Certified as Exhibit "O" in Doc. No. 2687)) — Reynolds, Gary K. (December 17, 2002). "U.S. Prisoners of War and Civilian American Citizens Captured and Interned by Japan in World War II: The Issue of Compensation by Japan" (<https://web.archive.org/web/20160112221108/http://fas.org/man/crs/RL30606.pdf>) (PDF). Congressional Research Service Report for Congress. Archived from the original (<https://fas.org/man/crs/RL30606.pdf>) (PDF) on January 12, 2016. One of the few existing original copy of this general order was found by Jack Edwards after the war, in the ruins of the Kinkaseki prisoner of war camp. Edwards & Walter 1991, p. 260
295. Stohl 1979, p. 279].

296. Gunter, Linda (August 30, 2016). "The Racism of the Nagasaki and Hiroshima Bombings" (<http://www.counterpunch.org/2016/08/30/the-racism-of-the-nagasaki-and-hiroshima-bombings/>). Counter Punch. Retrieved February 28, 2017.
297. "Historians: Soviet offensive, key to Japan's WWII surrender, was eclipsed by A-bombs" (<http://www.foxnews.com/world/2010/08/14/historians-soviet-offensive-key-japans-wwii-surrender-eclipsed-bombs/>). Fox News. Retrieved September 18, 2013.
298. Orr, James J. (2008). "Review of *Hiroshima in History: The Myths of Revisionism* and *The End of the Pacific War*". *Journal of Japanese Studies*. **34** (2,): 521–529. ISSN 0095-6848 (<https://www.worldcat.org/issn/0095-6848>). JSTOR 27756604 (<https://www.jstor.org/stable/27756604>).

References

- Allen, Louis (1969). "The Nuclear Raids". In Hart, Basil Liddell. *History of the Second World War*. Volume 6. London: Purnell. pp. 2566–2576.
- Alperovitz, Gar; Tree, Sanho (1996). *The Decision to Use the Atomic Bomb*. New York: Vintage. ISBN 0-679-76285-X.
- Asada, Sadao (1996). "The Shock of the Atomic Bomb and Japan's Decision to Surrender: A Reconsideration". In Hogan, Michael J. *Hiroshima in History and Memory*. New York: Cambridge University Press. ISBN 0-521-56682-7.
- Bagby, Wesley Marvin (1999). *America's International Relations Since World War I*. New York: Oxford University Press. ISBN 0-19-512389-1. OCLC 38574200 (<https://www.worldcat.org/oclc/38574200>).
- Bix, Herbert (1996). "Japan's Delayed Surrender: A Reinterpretation". In Hogan, Michael J. *Hiroshima in History and Memory*. New York: Cambridge University Press. ISBN 0-521-56682-7.
- Bodden, Valerie (2007). *The Bombing of Hiroshima & Nagasaki*. Mankato, Minnesota: The Creative Company. ISBN 1-58341-545-9.
- Bradley, F.J. (1999). *No Strategic Targets Left*. Paducah, Kentucky: Turner Publishing. ISBN 0-912799-07-2.
- Brooks, Risa; Stanley, Elizabeth A. (2007). *Creating Military Power: the Sources of Military Effectiveness*. Stanford, California: Stanford University Press. ISBN 0-8047-5399-7.
- Bungei, Shunjū Senshi Kenkyūkai (1981). *The Day Man Lost: Hiroshima*. Tokyo: Kodansha International. ISBN 0-87011-471-9.
- Burchett, Wilfred (2004). "The Atomic Plague". In Pilger, John. *Tell me No Lies*. New York: Thunder's Mouth Press. pp. 10–25. ISBN 0-224-06288-3. OCLC 61395938 (<https://www.worldcat.org/oclc/61395938>).
- Campbell, Richard H. (2005). *The Silverplate Bombers: A History and Registry of the Enola Gay and Other B-29s Configured to Carry Atomic Bombs*. Jefferson, North Carolina: McFarland & Company. ISBN 0-7864-2139-8. OCLC 58554961 (<https://www.worldcat.org/oclc/58554961>).
- Carroll, James (2007). *House of War: The Pentagon and the Disastrous Rise of American Power*. Boston: Houghton Mifflin Harcourt. ISBN 0-618-87201-9.
- Christman, Albert B. (1998). *Target Hiroshima: Deak Parsons and the Creation of the Atomic Bomb*. Annapolis, Maryland: Naval Institute Press. ISBN 1-55750-120-3. OCLC 38257982 (<https://www.worldcat.org/oclc/38257982>).
- Chun, Clayton K. S. (2008). *Japan, 1945: From Operation Downfall to Hiroshima and Nagasaki*. Oxford: Osprey. ISBN 978-1-84603-284-4. OCLC 191922849 (<https://www.worldcat.org/oclc/191922849>).
- Compton, Arthur (1956). *Atomic Quest*. New York: Oxford University Press. OCLC 173307 (<https://www.worldcat.org/oclc/173307>).
- Coox, Alvin D. (1969). "Japan at the End of Her Tether". In Hart, Basil Liddell. *History of the Second World War*. Volume 6. London: Purnell. pp. 2536–2544.
- Coox, Alvin D. (1994). "Air War Against Japan". In Cooling, B. Franklin. *Case Studies in the Achievement of Air Superiority* (<https://books.google.com/books?id=keUMn-pi5vKC&printsec=frontcover#v=onepage&q&f=false>). Washington, D.C.: Center for Air Force History. ISBN 0-912799-63-3. Retrieved March 2, 2014.
- Coster-Mullen, John (2012). *Atom Bombs: The Top Secret Inside Story of Little Boy and Fat Man*. Waukesha, Wisconsin: J. Coster-Mullen. OCLC 298514167 (<https://www.worldcat.org/oclc/298514167>).

- Craven, Wesley; Cate, James, eds. (1953). *The Pacific: Matterhorn to Nagasaki* (<http://www.ibiblio.org/hyperwar/AAF/V/index.html>). The Army Air Forces in World War II. Chicago: The University of Chicago Press. OCLC 256469807 (<https://www.worldcat.org/oclc/256469807>). Retrieved March 2, 2014.
- Delgado, James P. (2009). *Nuclear Dawn: the Atomic Bomb, from the Manhattan Project to the Cold War*. New York: Osprey. ISBN 978-1-84603-396-4. OCLC 297147193 (<https://www.worldcat.org/oclc/297147193>).
- Dietz, Suzanne Simon; Van Kirk, Theodore Jerome (2012). *My true course: Dutch Van Kirk, Northumberland to Hiroshima*. Lawrenceville, Georgia: Red Gremlin Press. ISBN 978-0-692-01676-3. OCLC 797975707 (<https://www.worldcat.org/oclc/797975707>).
- Drea, Edward J. (1992). *MacArthur's ULTRA: Codebreaking and the War Against Japan, 1942–1945*. Lawrence, Kansas: University Press of Kansas. ISBN 0-7006-0504-5. OCLC 23651196 (<https://www.worldcat.org/oclc/23651196>).
- Edwards, Jack; Walter, Jimmy (1991). *Banzai you Bastards*. London: Souvenir Press. ISBN 0-285-63027-X. OCLC 24908835 (<https://www.worldcat.org/oclc/24908835>).
- Edwards, Pail N. (1996). *The Closed World: Computers and the Politics of Discourse in Cold War America*. Cambridge, Massachusetts: The MIT Press. ISBN 0-262-55028-8. OCLC 807140394 (<https://www.worldcat.org/oclc/807140394>).
- Feraru, Arthur N. (May 17, 1950). "Public Opinion Polls on Japan". *Far Eastern Survey*. Institute of Pacific Relations. **19** (10): 101–103. doi:10.1525/as.1950.19.10.01p0599l (<https://doi.org/10.1525/as.1950.19.10.01p0599l>). ISSN 0362-8949 (<https://www.worldcat.org/issn/0362-8949>). JSTOR 3023943 (<https://www.jstor.org/stable/3023943>).
- Fiévé, Nicolas; Waley, Paul (2003). *Japanese Capitals in Historical Perspective: Place, Power and Memory in Kyoto, Edo and Tokyo*. London: RoutledgeCurzon. ISBN 0-7007-1409-X.
- Frank, Richard B. (1999). *Downfall: The End of the Imperial Japanese Empire*. New York: Random House. ISBN 0-679-41424-X.
- Fujiwara, Akira (1991). *Tettei kenshō Shōwa Tennō "dokuhakuroku"*. Tōkyō: Ōtsuki Shoten. ISBN 4-272-52022-9.
- Giangreco, D. M. (2009). *Hell to Pay: Operation Downfall and the Invasion of Japan 1945–1947*. Annapolis, Maryland: Naval Institute Press. ISBN 978-1-59114-316-1. OCLC 643381863 (<https://www.worldcat.org/oclc/643381863>).
- Glasstone, Samuel; Dolan, Philip J., eds. (1977). *The Effects of Nuclear Weapons* (<https://www.fourmilab.ch/etexts/www/effects/>). Washington, D.C.: United States Department of Defense and the Energy Research and Development Administration. OCLC 4016678 (<https://www.worldcat.org/oclc/4016678>). Retrieved December 5, 2016.
- Goldstein, Donald; Dillon, Katherine V; Wenger, J Michael (1995). *Rain of Ruin: a Photographic History of Hiroshima and Nagasaki*. Washington, D.C.: Brassey's. ISBN 1-57488-033-0. OCLC 31969557 (<https://www.worldcat.org/oclc/31969557>).
- Gowing, Margaret (1964). *Britain and Atomic Energy, 1935–1945*. London: Macmillan Publishing. OCLC 3195209 (<https://www.worldcat.org/oclc/3195209>).
- Groves, Leslie (1962). *Now it Can be Told: The Story of the Manhattan Project*. New York: Harper & Row. ISBN 0-306-70738-1. OCLC 537684 (<https://www.worldcat.org/oclc/537684>).
- Gruhl, Werner (2007). *Imperial Japan's World War II, 1931–1945*. New Brunswick, New Jersey: Transaction Publishers. ISBN 978-0-7658-0352-8. OCLC 76871604 (<https://www.worldcat.org/oclc/76871604>).
- Grunden, Walter E. (1998). "Hungnam and the Japanese atomic bomb: Recent Historiography of a Postwar Myth". *Intelligence and National Security*. **13** (2): 32–60. doi:10.1080/02684529808432475 (<https://doi.org/10.1080/02684529808432475>). ISSN 0268-4527 (<https://www.worldcat.org/issn/0268-4527>).
- Ham, Paul (2011). *Hiroshima Nagasaki*. Sydney: HarperCollins. ISBN 978-0-7322-8845-7. OCLC 746754306 (<https://www.worldcat.org/oclc/746754306>).
- Harvey, Robert (2007). *American Shogun: General MacArthur, Emperor Hirohito and the Drama of Modern Japan*. Woodstock, New York: The Overlook Press. ISBN 1-58567-891-0. OCLC 62134797 (<https://www.worldcat.org/oclc/62134797>).
- Hasegawa, Tsuyoshi (2006). *Racing the Enemy: Stalin, Truman, and the Surrender of Japan*. Cambridge, Massachusetts: The Belknap Press of Harvard University Press. ISBN 978-0-674-01693-4.

- Hein, Laura; Selden, Mark, eds. (1997). *Living with the Bomb: American and Japanese Cultural Conflicts in the Nuclear Age*. New York: M.E. Sharpe. ISBN 978-1-56324-967-9.
- Hewlett, Richard G.; Anderson, Oscar E. (1962). *The New World, 1939–1946* (<http://www.governmentattic.org/5docs/TheNewWorld1939-1946.pdf>) (PDF). University Park: Pennsylvania State University Press. ISBN 0-520-07186-7. OCLC 637004643 (<https://www.worldcat.org/oclc/637004643>). Retrieved 26 March 2013.
- Hixson, Walter L. (2002). *The American Experience in World War II: The Atomic Bomb in History and Memory*. New York: Routledge. ISBN 978-0-415-94035-1. OCLC 59464269 (<https://www.worldcat.org/oclc/59464269>).
- Hoddeson, Lillian; Henriksen, Paul W.; Meade, Roger A.; Westfall, Catherine L. (1993). *Critical Assembly: A Technical History of Los Alamos During the Oppenheimer Years, 1943–1945*. New York: Cambridge University Press. ISBN 0-521-44132-3. OCLC 26764320 (<https://www.worldcat.org/oclc/26764320>).
- Hoyt, Edwin P. (2001). *Japan's War: The Great Pacific Conflict*. New York: McGraw-Hill. ISBN 0-8154-1118-9. OCLC 12722494 (<https://www.worldcat.org/oclc/12722494>).
- Hubbell, Harry; Cheka, Joseph; Jones, Throyce (1969). *The Epicenters of the Atomic Bombs. Reevaluation of All Available Physical Data With Recommended Values*. Hiroshima: Atomic Bomb Casualty Commission. OCLC 404745043 (<https://www.worldcat.org/oclc/404745043>).
- Ishikawa, Eisei; Swain, David L. (1981). *Hiroshima and Nagasaki: The Physical, Medical, and Social Effects of the Atomic Bombings*. New York: Basic Books. ISBN 978-0-465-02985-3. OCLC 715904227 (<https://www.worldcat.org/oclc/715904227>).
- Johnston, Barbara Rose (2008). *The Consequential Damages of Nuclear War: The Rongelap Report*. Walnut Creek: Left Coast Press. ISBN 978-1-59874-346-3.
- Jones, Vincent (1985). *Manhattan: The Army and the Atomic Bomb*. Washington, D.C.: United States Army Center of Military History. OCLC 10913875 (<https://www.worldcat.org/oclc/10913875>).
- Jowett, Philip S.; Andrew, Stephen (2002). *The Japanese Army 1931–45: 2 1942–45*. Oxford: Osprey Publishing. ISBN 978-1-84176-354-5. OCLC 59395824 (<https://www.worldcat.org/oclc/59395824>).
- Kerr, E. Bartlett (1991). *Flames Over Tokyo: the US Army Air Forces' Incendiary Campaign against Japan 1944–1945*. New York: Donald I. Fine Inc. ISBN 1-55611-301-3.
- Kerr, George D.; Young, Robert W.; Cullings, Harry M.; Christy, Robert F. (2005). "Bomb Parameters". In Young, Robert W.; Kerr, George D. *Reassessment of the Atomic Bomb Radiation Dosimetry for Hiroshima and Nagasaki – Dosimetry System 2002* (<http://www.rerf.or.jp/shared/ds02/pdf/chapter01/cha01-p42-61.pdf>) (PDF). Hiroshima: The Radiation Effects Research Foundation. OCLC 271477587 (<https://www.worldcat.org/oclc/271477587>).
- Kido, Kōichi; Yoshitake, Oka (1966). 木戸幸一日記 [*Kido Kōichi Diary*] (in Japanese). Tōkyō: Tōkyō Daigaku Shuppankai. ISBN 4-13-030012-1.
- Knebel, Fletcher; Bailey, Charles W. (1960). *No High Ground*. New York: Harper and Row. ISBN 0-313-24221-6.
- Krimsky, Sheldon; Shorett, Peter (2005). *Rights and Liberties in the Biotech Age: Why We Need a Genetic Bill of Rights*. Lanham: Rowman & Littlefield. ISBN 0-7425-4341-2.
- Lewis, Robert A.; Tolzer, Eliot (August 1957). "How We Dropped the A-Bomb". *Popular Science*. pp. 71–75, 209–210. ISSN 0161-7370 (<https://www.worldcat.org/issn/0161-7370>).
- Lifton, Robert Jay (1991). *Death in Life: Survivors of Hiroshima*. Chapel Hill, North Carolina: University of North Carolina Press. ISBN 0-8078-4344-X. OCLC 490493399 (<https://www.worldcat.org/oclc/490493399>).
- Long, Gavin (1963). *The Final Campaigns* (https://www.webcitation.org/5hEkl2vls?url=http://www.awm.gov.au/histories/second_world_war/volume.asp?levelID=67909). Australia in the War of 1939–1945. Series 1 – Army. Volume 7. Canberra: Australian War Memorial. OCLC 1297619 (<https://www.worldcat.org/oclc/1297619>). Archived from the original (http://www.awm.gov.au/histories/second_world_war/volume.asp?levelID=67909) (PDF) on June 2, 2009. Retrieved October 31, 2011.
- McCormack, Mary (2008). "Radiotherapy and Cancer". In Sean Kehoe; Eric Jauniaux; Pierre Martin-Hirsch; Philip Savage. *Cancer and Reproductive Health*. London: Royal College of Obstetricians and Gynaecologists. ISBN 978-1-904752-61-5.
- McNelly, Theodore H. (2000). "The Decision to Drop the Atomic Bomb". In Jacob Neufeld. *Pearl Harbor to V-J Day: World War II in the Pacific*. New York: Diane Publishing Co. ISBN 1-4379-1286-9.

- Miller, Richard Lee (1986). *Under the Cloud: The Decades of Nuclear Testing*. New York: Two-Sixty Press. [ISBN 0-02-921620-6](#).
- Monk, Ray (2012). *Robert Oppenheimer: A Life Inside the Center*. New York; Toronto: Doubleday. [ISBN 978-0-385-50407-2](#).
- Moore, Mike (July–August 1995). "Troublesome Imagery". *Bulletin of Atomic Scientists*. Educational Foundation for Nuclear Science. **54** (4): 73–74. [ISSN 0096-3402 \(https://www.worldcat.org/issn/0096-3402\)](#).
- Newman, Robert P. (1995). *Truman and the Hiroshima Cult*. East Lansing, Michigan: Michigan State University Press. [ISBN 0-87013-403-5](#). [OCLC 32625518 \(https://www.worldcat.org/oclc/32625518\)](#).
- Powaski, Ronald E. (1987). *March to Armageddon: The United States and the Nuclear Arms Race, 1939 to the Present*. Oxford: Oxford University Press. [ISBN 978-0-19-536454-5](#).
- Preston, Diana (2005). *Before The Fallout: From Marie Curie to Hiroshima*. New York: Walker & Co. [ISBN 0-8027-1445-5](#).
- Reischauer, Edwin O. (1986). *My Life Between Japan And America*. New York: Harper & Row. [ISBN 0-06-039054-9](#). [OCLC 13114344 \(https://www.worldcat.org/oclc/13114344\)](#).
- Rotter, Andrew J. (2008). *Hiroshima: The World's Bomb*. Oxford: Oxford University Press. [ISBN 0-19-280437-5](#).
- Russ, Harlow W. (1990). *Project Alberta: The Preparation of Atomic Bombs For Use in World War II*. Los Alamos, New Mexico: Exceptional Books. [ISBN 978-0-944482-01-8](#). [OCLC 24429257 \(https://www.worldcat.org/oclc/24429257\)](#).
- Sandler, Stanley (2001). *World War II in the Pacific: an Encyclopedia*. New York: Taylor & Francis. [ISBN 0-8153-1883-9](#). [OCLC 44769066 \(https://www.worldcat.org/oclc/44769066\)](#).
- Schaffer, Ronald (1985). *Wings of Judgment: American Bombing in World War II*. New York: Oxford University Press. [ISBN 0-19-503629-8](#). [OCLC 11785450 \(https://www.worldcat.org/oclc/11785450\)](#).
- Selden, Kyoko Iriye; Selden, Mark (1990). *The Atomic Bomb: Voices from Hiroshima and Nagasaki*. Armonk, New York: M.E. Sharpe. [ISBN 0-87332-773-X](#). [OCLC 20057103 \(https://www.worldcat.org/oclc/20057103\)](#).
- Sharp, Patrick B. "From Yellow Peril to Japanese Wasteland: John Hersey's 'Hiroshima'". *Twentieth Century Literature*. **46** (2000): 434–452. [JSTOR 827841 \(https://www.jstor.org/stable/827841\)](#).
- Sherwin, Martin J. (2003). *A World Destroyed: Hiroshima and its Legacies*. Stanford, California: Stanford University Press. [ISBN 0-8047-3957-9](#). [OCLC 52714712 \(https://www.worldcat.org/oclc/52714712\)](#).
- Sklar, Morty, ed. (1984). *Nuke-rebuke: Writers & Artists Against Nuclear Energy & Weapons*. Iowa City, Iowa: The Spirit That Moves Us Press. [ISBN 0-930370-16-3](#). [OCLC 10072916 \(https://www.worldcat.org/oclc/10072916\)](#).
- Slavinskii, Boris Nikolaevich (2004). *The Japanese-Soviet Neutrality Pact: A Diplomatic History, 1941–1945*. Nissan Institute/Routledge Japanese Studies Series. London; New York: RoutledgeCurzon. [ISBN 978-0-415-32292-8](#).
- Sodei, Rinjiro (1998). *Were We the Enemy? American Survivors of Hiroshima*. Boulder, Colorado: Westview Press. [ISBN 0-8133-2960-4](#).
- Stohl, Michael (1979). *The Politics of Terrorism*. New York: M. Dekker. [ISBN 978-0-8247-6764-8](#). [OCLC 4495087 \(https://www.worldcat.org/oclc/4495087\)](#).
- Sweeney, Charles; Antonucci, James A.; Antonucci, Marion K. (1997). *War's End: An Eyewitness Account of America's Last Atomic Mission*. New York: Quill Publishing. [ISBN 0-380-78874-8](#).
- Thomas, Gordon; Morgan-Witts, Max (1977). *Ruin from the Air*. London: Hamilton. [ISBN 0-241-89726-2](#). [OCLC 252041787 \(https://www.worldcat.org/oclc/252041787\)](#).
- Tibbets, Paul W. (1998). *Return Of The Enola Gay*. New Hope, Pennsylvania: Enola Gay Remembered. [ISBN 0-9703666-0-4](#). [OCLC 69423383 \(https://www.worldcat.org/oclc/69423383\)](#).
- Wainstock, Dennis D. (1996). *The Decision to Drop the Atomic Bomb*. Westport, Connecticut: Praeger. [ISBN 0-275-95475-7](#). [OCLC 33243854 \(https://www.worldcat.org/oclc/33243854\)](#).
- Walker, J. Samuel (January 1990). "The Decision to Use the Bomb: A Historiographical Update". *Diplomatic History*. **14** (1): 97–114. [doi:10.1111/j.1467-7709.1990.tb00078.x \(https://doi.org/10.1111%2Fj.1467-7709.1990.tb00078.x\)](#). [ISSN 1467-7709 \(https://www.worldcat.org/issn/1467-7709\)](#).

- Walker, J. Samuel (April 2005). "Recent Literature on Truman's Atomic Bomb Decision: A Search for Middle Ground" (<http://onlinelibrary.wiley.com/doi/10.1111/j.1467-7709.2005.00476.x/pdf>). *Diplomatic History*. **29** (2): 311–334. doi:10.1111/j.1467-7709.2005.00476.x (<https://doi.org/10.1111%2Fj.1467-7709.2005.00476.x>). ISSN 1467-7709 (<http://www.worldcat.org/issn/1467-7709>). Retrieved January 30, 2008.
- Werrell, Kenneth P. (1996). *Blankets of Fire: U.S. Bombers over Japan during World War II*. Washington, D.C.: Smithsonian Institution Press. ISBN 1-56098-665-4. OCLC 32921746 (<https://www.worldcat.org/oclc/32921746>).
- White, Geoffrey. M. (July 1995). "Memory Wars: The Politics of Remembering the Asia-Pacific War" (<http://scholarspace.manoa.hawaii.edu/bitstream/handle/10125/3807/api021.pdf?sequence=1>) (PDF). *Asia-Pacific Issues* (21). ISSN 1522-0966 (<https://www.worldcat.org/issn/1522-0966>). Retrieved June 30, 2013.
- Williams, M. H. (1960). *Chronology, 1941–1945*. Washington, D.C.: Office of the Chief of Military History, Department of the Army. OCLC 1358166 (<https://www.worldcat.org/oclc/1358166>).
- Zaloga, Steven J.; Noon, Steve (2010). *Defense of Japan 1945*. Fortress. Oxford: Osprey Publishing. ISBN 1-84603-687-9. OCLC 503042143 (<https://www.worldcat.org/oclc/503042143>).

Further reading

- Allen, Thomas; Polmar, Norman (1995). *Code-Name Downfall*. New York: Simon & Schuster. ISBN 0-684-80406-9.
- The Committee for the Compilation of Materials on Damage Caused by the Atomic Bombs in Hiroshima and Nagasaki (1981). *Hiroshima and Nagasaki: The Physical, Medical, and Social Effects of the Atomic Bombings*. New York: Basic Books. ISBN 0-465-02985-X.
- Frank, Richard B. (1999). *Downfall*. New York: Random House. ISBN 978-0141001463.
- Giangreco, D. M. (2011). *Hell to Pay: Operation DOWNFALL and the Invasion of Japan, 1945-1947*. Annapolis: Naval Institute Press. ISBN 978-1682471654.
- Gordin, Michael D. (2007). *Five Days in August: How World War II Became a Nuclear War*. Princeton, New Jersey: Princeton University Press. ISBN 0-691-12818-9. OCLC 70630623 (<https://www.worldcat.org/oclc/70630623>).
- Gosling, Francis George (1994). *The Manhattan Project : Making the Atomic Bomb*. Washington, D.C.: United States Department of Energy, History Division. OCLC 637052193 (<https://www.worldcat.org/oclc/637052193>).
- Heinrichs, Waldo; Gallicchio, Marc (2017). *Implacable Foes: War in the Pacific, 1944-1945*. New York: Oxford University Press. ISBN 978-0190616755.
- Hogan, Michael J. (1996). *Hiroshima in History and Memory*. Cambridge, New York: Cambridge University Press. ISBN 0-521-56206-6.
- Hornfischer, James D. (2017). *The Fleet at Flood Tide: America at Total War in the Pacific, 1944–1945*. New York: Bantam Books. ISBN 978-0345548702.
- Kanabun (2012). Kyoko; Tam, Young, eds. *A story of a girl who survived an atomic bomb* (http://homepage3.nifty.com/sasurai/Z_ENG.html) [原爆に遭った少女の話]. ASIN B00HJ6H2EK (<https://www.amazon.com/dp/B00HJ6H2EK>). Retrieved December 25, 2013.
- Krauss, Robert; Krauss, Amelia (2005). *The 509th Remembered: A History of the 509th Composite Group as Told by the Veterans Themselves*. Buchanan, Michigan: 509th Press. ISBN 0-923568-66-2. OCLC 59148135 (<https://www.worldcat.org/oclc/59148135>).
- Merton, Thomas (1962). *Original Child Bomb: Points for Meditation to be Scratched on the Walls of a Cave*. New York: New Directions. OCLC 4527778 (<https://www.worldcat.org/oclc/4527778>).
- Murakami, Chikayasu (2007). *Hiroshima no shiroi sora (The White Sky in Hiroshima)*. Tokyo: Bungeisha. ISBN 4-286-03708-8.
- Ogura, Toyofumi (1948). *Letters from the End of the World: A Firsthand Account of the Bombing of Hiroshima*. Tokyo: Kodansha International. ISBN 4-7700-2776-1.
- Sekimori, Gaynor (1986). *Hibakusha: Survivors of Hiroshima and Nagasaki*. Tokyo: Kosei Publishing Company. ISBN 4-333-01204-X.
- Thomas, Gordon; Morgan-Witts, Max (1977). *Enola Gay: The Bombing of Hiroshima*. New York: Konecky & Konecky. ISBN 1-56852-597-4.

- Ward, Wilson (Spring 2007). "The Winning Weapon? Rethinking Nuclear Weapons in Light of Hiroshima". *International Security*. **31** (4): 162–179. doi:10.1162/isec.2007.31.4.162 (https://doi.org/10.1162%2Fisec.2007.31.4.162). ISSN 1531-4804 (https://www.worldcat.org/issn/1531-4804).
- Warren, Stafford L. (1966). "Manhattan Project". In Ahnfeldt, Arnold Lorentz. *Radiology in World War II*. Washington, D.C.: Office of the Surgeon General, Department of the Army. OCLC 630225 (https://www.worldcat.org/oclc/630225).

External links


Present day

- Are Nagasaki and Hiroshima still radioactive? (<http://zidbits.com/2013/11/is-nagasaki-and-hiroshima-still-radioactive/>) – No. Includes explanation.

The decision

- "Order from General Thomas Handy to General Carl Spaatz authorizing the dropping of the first atomic bomb" (https://en.wikisource.org/wiki/Order_from_General_Thomas_Handy_to_General_Carl_Spaatz_authorizing_the_dropping_of_the_first_atomic_bomb). Wikisource. 2015.
- "Documents on the Decision to Drop the Atomic Bomb" (http://www.trumanlibrary.org/whistlestop/study_collections/bomb/large/index.php). Harry S. Truman Presidential Library and Museum. Retrieved January 3, 2012.
- "President Truman Defends Use of Atomic Bomb, 1945:Original Letters" (<http://www.shapell.org/manuscript.aspx?truman-defends-use-of-atomic-bomb-against-japan>). Shapell Manuscript Foundation. Retrieved February 8, 2014.
- "Correspondence Regarding Decision to Drop the Bomb" (<http://www.nuclearfiles.org/menu/library/correspondence/index.htm#decision>). Nuclear Age Peace Foundation. Retrieved January 3, 2012.

The effects

- "The Effects of the Atomic Bombings of Hiroshima and Nagasaki" (http://www.trumanlibrary.org/whistlestop/study_collections/bomb/large/documents/index.php?documentdate=June%201946&documentid=65&studycollectionid=a_bomb&pagenumber=1). *U.S. Strategic Bombing Survey*. Harry S. Truman Presidential Library and Museum. 1946. Retrieved January 3, 2012.
- "Scientific Data of the Nagasaki Atomic Bomb Disaster" (<http://www-sdc.med.nagasaki-u.ac.jp/n50/start-E.html>). Atomic Bomb Disease Institute, Nagasaki University. Retrieved January 3, 2012.
- "Tale of Two Cities: The Story of Hiroshima and Nagasaki" (<http://www.atomicarchive.com/History/twocities/index.shtml>). National Science Digital Library. Retrieved January 3, 2012.
- "The Atomic Bombings of Hiroshima and Nagasaki" (<http://www.atomicarchive.com/Docs/MED/index.shtml>). Atomic Archive. 1946. Retrieved January 3, 2012.
- "The Atomic Bomb and the End of World War II" (<http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB162/72.pdf>) (PDF). National Security Archive. Retrieved January 3, 2012.
- The short film *Children of Hiroshima (Reel 1 of 2) (1952)* (<https://archive.org/details/gov.archives.arc.645748.r1>) is available for free download at the Internet Archive
- The short film *Children of Hiroshima (Reel 2 of 2) (1952)* (<https://archive.org/details/gov.archives.arc.645748.r2>) is available for free download at the Internet Archive
- "Photo gallery of aftermath pictures" (<https://web.archive.org/web/20120719094423/http://life.time.com/history/hiroshima-and-nagasaki-unpublished-photos/#1>). Time-Life. Archived from the original (<http://life.time.com/history/hiroshima-and-nagasaki-unpublished-photos/#1>) on July 19, 2012. Retrieved February 8, 2014.
- Video footage of the bombing of Nagasaki (silent) (<https://www.youtube.com/watch?v=Z9v5sW6t0zI>) on YouTube
- Video footage of the bombing of Hiroshima (<https://www.youtube.com/watch?v=3wxWNAM8Cso>) on YouTube
-  *The Atomic Bombings of Hiroshima & Nagasaki* (https://librivox.org/search?title=The+Atomic+Bombings+of+Hiroshima++Nagasaki&author=Engineers&reader=&keywords=&genre_id=0&status=all&project_type=either&recorded_language=&sort_order=catalog_date&search_page=1&search_form=advanced) public domain audiobook at LibriVox

Archives

- "Nagasaki Archive" (<http://e.nagasaki.mapping.jp/p/nagasaki-archive.html>). Google Earth mapping of Nagasaki bombing archives. Retrieved January 3, 2012.

- "Hiroshima Archive" (<http://hiroshima.mapping.jp/>). Google Earth mapping of Hiroshima bombing archives. Retrieved January 3, 2012.

Bibliographies

- "Annotated bibliography for atomic bombings of Hiroshima and Nagasaki" (http://alsos.wlu.edu/adv_rst.aspx?keyword=use*atomic*bombs*japan&creator=&title=&media=all&genre=all&disc=all&level=all&sortby=relevance&results=10&period=15). Alsos Digital Library for Nuclear Issues. Retrieved January 3, 2012.

Commemoration

- An Unrecognized Loss – Message From Hiroshima (film) (https://www.un.org/disarmament/education/Movies/an_unrecognized_loss/)
- Hiroshima National Peace Memorial Hall For The Atomic Bomb Victims (<http://www.hiro-tsuitokinenkan.go.jp/english/index.php>)
- Nagasaki National Peace Memorial Hall For The Atomic Bomb Victims (<http://www.peace-nagasaki.go.jp/english/index.html>)
- Hiroshima Peace Memorial Museum (http://www.pcf.city.hiroshima.jp/top_e.html)
- Hiroshima and Nagasaki: A Look Back at the US Atomic Bombing 64 Years Later (http://www.democracynow.org/2009/8/10/hiroshima_and_nagasaki_a_look_back) – video by Democracy Now!
- Hiroshima & Nagasaki Remembered (<http://hiroshima-remembered.com/>) 2005 website commemorating 60th anniversary

Retrieved from "https://en.wikipedia.org/w/index.php?title=Atomic_bombings_of_Hiroshima_and_Nagasaki&oldid=819001165"

This page was last edited on 6 January 2018, at 20:57.

Text is available under the Creative Commons Attribution-ShareAlike License; additional terms may apply. By using this site, you agree to the [Terms of Use](#) and [Privacy Policy](#). Wikipedia® is a registered trademark of the [Wikimedia Foundation, Inc.](#), a non-profit organization.